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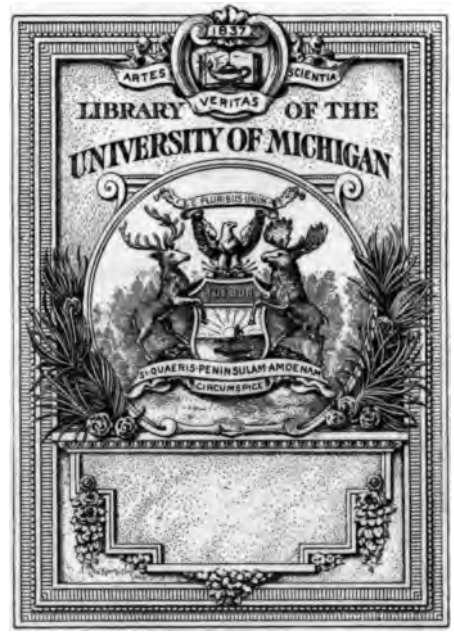

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ANNUAL REPORTS, WAR DEPARTMENT

FISCAL YEAR ENDED JUNE 30, 1908

REPORT OF THE

CHIEF OF ENGINEERS U. S. ARMY

1908

IN THREE PARTS

PART III

WASHINGTON
GOVERNMENT PRINTING OFFICE
1908

APPENDIXES

TO THE

REPORT OF THE CHIEF OF ENGINEERS,

UNITED STATES ARMY

(CONTINUED).

APPENDIX Q Q.

IMPROVEMENT OF RIVERS AND HARBORS IN THE BUFFALO, NEW YORK, DISTRICT.

REPORT OF LIEUT. COL. W. L. FISK, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Erie Harbor, Pennsylvania.
2. Dunkirk Harbor, New York.
3. Buffalo Harbor, New York.
4. Lake Erie entrance to Black Rock Harbor and Erie Basin, New York.
5. Buffalo entrance to Erie Basin and Black Rock Harbor, New York.
6. Black Rock Harbor and channel, New York.
7. Tonawanda Harbor and Niagara River, New York.

UNITED STATES ENGINEER OFFICE,
Buffalo, N. Y., July 17, 1908.

SIR: I have the honor to forward herewith reports of operations on river and harbor works in this district during the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

W. L. FISK,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

Q Q 1.

IMPROVEMENT OF HARBOR AT ERIE, PENNSYLVANIA.

REPORT OF OPERATIONS.

At the beginning of the fiscal year, repairing 750 feet of the north pier with concrete superstructure, under contract with Wm. H. Shelton, was in progress.

This work was completed October 4, 1907, at a cost of $26,131.38.

Under contract with the Great Lakes Dredge and Dock Company, for stone superstructure on 1,200 linear feet of the south breakwater and extending the south pier 500 feet lakeward, the breakwater work was commenced August 12 and completed October 26, 1907, at a cost of $8,793.80.

207283

Work on the extension of the south pier was begu 1907, and at the close of the season all of the 500 fee sunk and filled, being left to settle during the winte

Leveling cribs and making concrete blocks for supe in progress at the end of the fiscal year, and the worl pleted December 31, 1908.

Minor repairs to deck of timber portion (1,262 linea pier were made by hired labor, October 3 to Novembc cost of $1,401.75.

CONDITION OF THE WORKS.

The south pier and south breakwater are in good c north pier is in good condition, except 752 feet with structure, which should soon be replaced with concret

The entrance channel and harbor basin are in fair some dredging will be required in the channel from tim

The preservation of the peninsula is of vital impo Harbor, and it is for the purpose of preserving the h protection of the weak parts of the peninsula has been sary. The weakest portion is the long, narrow neck end, and works of protection have been constructed breach through this narrow neck. The danger exists storms from the westward.

The protection works for the neck consist of the shore protection constructed in 1889, which affords li tection, and the tree growth propagated and maintaine During 1896–1898 about 6,600 young locust and will planted on the neck of the peninsula. Most of these finely, but some of the outer ones have been washed seas.

The beach erosion along the body of the peninsula materially corrected by jetties built out from the s present time there is one dilapidated jetty at the ea longer of service, and three jetties about the middle of shore, one of which belongs to the Light-House Est fair condition.

A severe storm on January 20, 1907, made some c shore lines of the peninsula, but no serious damage wa

PROPOSED OPERATIONS AND REMARKS.

The extension of the south pier 500 feet under cont Great Lakes Dredge and Dock Company will complete March 3, 1899, except for maintenance, and protecti Isle Peninsula.

It is proposed to repair 752 feet of the timber portio pier with concrete superstructure, to do necessary drec nel, to maintain project depth, and to protect Presque I with funds remaining on hand after the present project and no estimate of funds is made in this report.

Money statement.

July 1, 1907, balance unexpended		$170,728.78
Received from sales		1.50
		170,730.28
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$29,954.50	
For maintenance of improvement	26,841.14	
		56,795.64
July 1, 1908, balance unexpended		113,934.64
July 1, 1908, balance available		113,934.64
July 1 1908 amount covered by uncompleted contracts		38,864.41

APPROPRIATIONS AND ALLOTMENTS.

1823	$150.00	June 10, 1872	$15,000.00
May 26, 1824	20,000.00	June 23, 1874	20,000.00
May 25, 1826	7,000.00	March 3, 1875	80,000.00
March 2, 1827	2,000.00	August 14, 1876	40,000.00
May 19, 1828	6,223.18	June 16, 1878	25,000.00
March 3, 1829	7,390.25	March 3, 1879	25,000.00
March 2, 1831	1,700.00	June 14, 1880	25,000.00
July 3, 1832	4,500.00	March 3, 1881	20,000.00
March 2, 1833	6,000.00	August 2, 1882	20,000.00
June 28, 1834	23,045.00	July 5, 1884	50,000.00
March 3, 1835	5,000.00	August 5, 1886	37,500.00
July 2, 1836	15,122.80	August 11, 1888	83,000.00
March 3, 1837	15,000.00	September 19, 1890	40,000.00
July 7, 1838	30,000.00	July 13, 1892	40,000.00
June 11, 1844	40,000.00	August 18, 1894	10,000.00
August 30, 1852	30,000.00	May 11, 1896	1,289.33
1864 (allotment)	15,000.00	March 3, 1899	125,000.00
June 23, 1866	36,961.00	June 13, 1902	125,000.00
March 2, 1867	25,000.00	March 3, 1905	125,000.00
1868 (allotment)	40,000.00	March 2, 1907	120,000.00
1869 (allotment)	22,275.00	Received from sales	4,724.39
June 11, 1870	20,000.00		
March 3, 1871	29,000.00	Total	1,442,880.95
1871 (allotment)	10,000.00		

CONTRACTS IN FORCE.

FOR EXTENDING SOUTH PIER AND STONE SUPERSTRUCTURE ON SOUTH BREAKWATER AT ERIE HARBOR, PENNSYLVANIA, DATED JUNE 29, 1907.

Name of contractor: Great Lakes Dredge & Dock Company, Chicago, Ill.

Rates, extending south pier:	
Dredging for foundation, per cubic yard, scow measure	$1.00
Foundation stone, per cubic yard	2.10
Riprap stone, per cubic yard	2.10
Timber cribs filled with stone and leveled, per linear foot	48.90
Concrete blocks, per cubic yard	10.00
Mass concrete, per cubic yard	8.65
Filling stone in superstructure, per cubic yard	2.10
Manhole covers, per cover	7.90
Stone superstructure on south breakwater:	
Removing old superstructure, per linear foot	3.00
Rubble and paving stone, per ton of 2,000 pounds	3.10

Date of approval: July 11, 1907.
Date of commencement: August 15, 1907.
Date of completion: December 31, 1908.
Total amount of contract, $58,766.15.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending Decem

Vessels.	Arrivals from—				Dep	
	Home ports.		Foreign ports.		Home ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons
Steam	1,175	2,468,385	111	65,826	1,172	2,482,
Sail and barges	136	162,377	35	11,592	124	147,
Total	1,311	2,630,762	146	77,418	1,296	2,630,

Total arrivals and departures:
- Number
- Tonnage

Increase of tonnage 1907 over 1906

Amount of revenue collected, year 1907:
- Lake commerce
- Rail commerce

Value of imports:
- Lake
- Rail

Value of exports: Lake

Enrolled tonnage, port of Erie, Pa. gross

Greatest draft of vessels

Receipts and shipments by lake.

RECEIPTS.

[Tons of 2,000 pounds.]

	1903.	1904.	1905.
Merchandise	89,141	82,168	148,091
Barley	6,863	4,776	1,408
Corn	95,849	10,917	19,535
Rye	10,233	3,501	.....
Wheat	33,588	29,858	41,515
Flaxseed	.....	.....	6,943
Flour	166,631	84,790	148,091
Lumber	17,903	21,012	16,431
Lath	115	124	.....
Poles and stave bolts	12	80	.....
Ties	732	.....	.....
Iron ore	1,257,798	1,467,805	2,377,213
Copper	12,975	6,655	4,489
Lead	2,973	1,244	8,411
Stone	2,700	.....	7,750
Fish	3,800	4,009	4,469
Pulp wood	16,988	9,225	29,766
Total	1,718,301	1,726,164	2,814,112

SHIPMENTS.

Anthracite coal	291,642	233,507	291,900
Bituminous coal	533,586	453,044	521,866
Pig and manufactured iron	642	.....	.....
Merchandise	118,788	97,752	132,350
Total	944,658	784,303	946,116

Q Q 2.

IMPROVEMENT OF HARBOR AT DUNKIRK, NEW YORK.

REPORT OF OPERATIONS.

At the beginning of the fiscal year work of repairing structures had been commenced with hired labor and materials purchased.

The work continued to December 19, 1907, when it was suspended, $12,977.09 having been expended during the season.

The repairs made were as follows:

Breakwater.—Rebuilding timber back wall and deck on 860 linear feet, wrecked by storm of January 20, 1907, and also placing 660 cubic yards filling stone in this section; replacing with concrete 71 linear feet of wrecked and damaged timber lake slope; replacing broken deck plank on 481 linear feet of timber breakwater.

West pier.—Rebuilding 167 linear feet of timber pier at shore end; replacing broken back wall timbers and deck plank of superstructure on the 110-foot timber section; replacing broken deck plank on the 265-foot timber section at outer end of pier.

In June, 1908, preparations were made for further repairs, and at the close of the fiscal year work had been commenced.

These repairs will consist of replacing with concrete about 80 linear feet of wrecked slope timber on breakwater, placing 435 cubic yards of filling stone in breakwater and pier, and repairing crib substructure on 50 linear feet of timber pier.

CONDITION OF THE WORKS.

Both the west pier and the breakwater are in poor condition and need repairs annually. They were damaged by storm January 20, 1907, and are liable to further damage by severe storms.

The entrance channel and harbor basin are in fair condition.

PROPOSED OPERATIONS AND REMARKS.

The work outlined in the adopted project for Dunkirk Harbor has been completed, except maintenance, which will be required indefinitely.

It is estimated that this will cost $5,000 per year, and $10,000 should be appropriated for two years' maintenance.

The commerce of Dunkirk is small and is not increasing.

Money statement.

July 1, 1907, balance unexpended	$18,308.81
Received from sales	130.00
	18,438.81
June 30, 1908, amount expended during fiscal year for maintenance of improvement	12,202.39
July 1, 1908, balance unexpended	6,236.42
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	10,000.00

APPROPRIATIONS AND ALLOTMENTS

March 27, 1827	$3,000.00	June 23, 1874	
May 19, 1828	6,000.00	March 3, 1875	
March 3, 1829	9,812.75	August 14, 1876	
April 23, 1830	1,342.75	1879	
March 2, 1831	7,102.50	June 14,1880	
July 3, 1832	10,200.00	July 5, 1884	
June 28, 1834	4,000.00	August 5, 1885	
March 3, 1835	10,988.43	August 11, 1888	
July 2, 1836	11,000.00	September 19, 1890	
March 3, 1837	15,000.00	July 13, 1892	
July 7, 1838	10,000.00	August 18, 1894	
June 11, 1844	5,000.00	June 3, 1896	
August 30, 1852	30,000.00	June 22, 1896 (repayn	
March 2, 1867	100,000.00	June 4, 1897	
1869	2,000.00	June 13, 1902	
July 11, 1870	25,000.00	January 6, 1908 (sales	
March 3, 1871	25,000.00		
June 10, 1872	25,000.00	Total	
March 3, 1873	48,132.95		

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending Decer

Vessels.	Arrivals from—				Depa	
	Home ports.		Foreign ports.		Home ports.	
	Number.	Tons.	Number.	Tons.	Number.	Ton
Steam	42	2,179	6	712	43	2,
Total	42	2,179	6	712	43	2,

Total arrivals and departures:
Number
Tonnage
Decrease in tonnage, 1907 under 1906
Amount of revenue collected for the year 1907, rail
Value of imports, rail
Receipts by lake, stone and machinery
Enrolled tonnage, port of Dunkirk, N. Y. gros
Greatest draft of vessels

Q Q 3.

IMPROVEMENT OF BUFFALO HARBOR, NEW

REPORT OF OPERATIONS.

Extension of Stony Point section of breakwater.—Th have a length of 1,000 feet, running in a northwes from the north end of the present Stony Point secti of 150 degrees from the axis of said section, and buil called the "south entrance arm."

This was raised to a height of 12 feet below mean lake level with stone excavated from Lake Erie entrance to Black Rock Harbor and Erie Basin, and a contract was made with the Canal Quarry Company, of Buffalo, May 31, 1906, for completion of so much of it as the funds then available, approximately $130,000, would allow.

Work under this contract has been in progress during the fiscal year and is now only about one-fourth completed.

Stone superstructure, sea slope, and riprap on South Harbor section of breakwater.—Contract of C. M. Handy for this work called for completion December 31, 1906, but this time limit was waived, and the work completed October 2, 1907, at a cost, exclusive of office and engineering expenses, of $101,805.43, the amount of $621.66 having been deducted for expenses incurred by reason of delay in completion.

Under this contract 723 linear feet of wrecked timber breakwater was rebuilt in permanent rubble mound form.

Repairs to breakwater damaged by storm of January 20, 1907.—A severe wind storm on January 20, 1907, damaged the old section of the breakwater for a distance of 1,910 feet, the timber superstructure being practically destroyed. Damage was also done to the decks and walls on other portions of the timber breakwater.

An appropriation of $350,000 was made by the river and harbor act of March 2, 1907, to repair this damage.

A project was submitted and approved for placing a stone-concrete superstructure on the 1,910-foot section of the old breakwater, and a contract was made May 31, 1907, with the Great Lakes Construction Company, of Buffalo, the lowest bidder, for this work.

Work under this contract has been in progress during the fiscal year. Fourteen thousand eight hundred and eighty-five cubic yards capping stone and 4,443.5 cubic yards rubblestone have been placed, none of the superstructure being fully completed.

The storm wrecked the middle and banquette decks on the Stony Point section of the breakwater. The wrecked timberwork was removed by day's labor to the level of the banquette on the outer 900 linear feet of structure, and a covering of large rubblestone was laid on the cribwork behind the parapet.

An emergency contract was made with the Canal Quarry Company July 15, 1907, for depositing 8,000 tons of this large stone on the Stony Point section and as riprap along the lake side of the old section of breakwater, the work to be completed December 1, 1907.

At the date for completion the contractors had deposited only 4,605.4 tons of stone, and as the time limit had not been waived nor application for extension made, the contract became terminated by its own terms.

Repairs to decks of the timber portions of breakwater damaged by the storm were made July 1 to October 11, 1907, at a cost of $7,502.98 for material and labor.

Dredging at south end of harbor.—The river and harbor act of March 2, 1907, appropriated $25,000 for dredging at entrance to canals at South Buffalo, in outer harbor.

A project for this work was submitted and approved and contract was made with the Buffalo Dredging Company, the lowest bidder, June 12, 1907, for the work.

Work under this contract was begun July 10 August 14, 1907, 100,273 cubic yards of sand and cla and the area between the 23-foot contour of depth bor and the harbor and dock line, from the west line of Steel Company canal to the north line of the Buff hanna-Pennsylvania Canal, dredged to a depth of lake level at a cost, exclusive of office and enginee $14,038.22.

Excavating shoals outside north entrance to harbor. tion of $56,100 was made by the river and harbor 1907, for excavating rock shoals at entrance of Buf depth of 23 feet.

A project for the work was forwarded and approv was made June 14, 1907, with the Lake Erie Dredgi lowest bidder.

At the beginning of the fiscal year work had been it was continued through the year, slow progress bei on account of unfavorable weather and sea.

The work should have been completed December time limit was waived, and the work will probably b season.

Miscellaneous.—The inspection steamer *Thomas* was on duty throughout the year on the inspection harbor works, on the care of floating plant, and on of laws for the protection of navigation, notably dredgings.

A watchman was on duty throughout the yea States engineer storehouse on the south pier for th property, and he also acted as ferryman for employ to and from the storehouse, and had charge of the gauge.

The north pier at the entrance to Buffalo River, Delaware, Lackawanna and Western Railroad Com one of the Government harbor works permanently o porations or private parties.

The occupancy was begun in 1878. A history of and copies of official documents relating thereto a Report of the Chief of Engineers for 1889, pages 237 the report for 1898, page 2775 et seq.

CONDITION OF THE WORKS.

At the close of the fiscal year the condition of th follows:

Entrance piers.—These works, forming the entran harbor, which comprises Buffalo Creek and city ship fair condition.

The north pier remains in the possession of the De wanna and Western Railroad Company.

The south pier has a concrete superstructure for its is in good condition.

Breakwater system.—This system comprises four se water separated by three entrance channels.

The north breakwater, 2,200 feet long, is a permanent concrete structure and is in good condition.

The old breakwater is 7,608 feet long, of which 4,894 feet is in permanent concrete form and 2,714 feet in timber cribwork. One thousand nine hundred and ten feet of the timber superstructure was wrecked by storm of January 20, 1907, and its reconstruction with stone and concrete is in progress. This section needs heavy riprap along the lake face.

The south harbor breakwater is 9,989 feet long. The northerly 7,250 feet is of rubblestone type, a permanent form. The next 360 feet is of timber crib with stone sea slope, and the adjoining 363 feet of timber crib with stone superstructure and sea slope. Following this is 1,800 feet of timber crib with concrete superstructure, and the southerly 216 feet is timber crib with a timber superstructure. All in good condition, but needs heavy riprap along the lake face of the timber-concrete portion.

The Stony Point breakwater is 2,803 feet long, connecting with the shore, and is of timber-crib type. This section is in fair condition, but needs heavy riprap along the lake face.

PROPOSED OPERATIONS AND REMARKS.

It is proposed during the next fiscal year, with funds now on hand, to continue the extension of the Stony Point section of breakwater; to continue the repair of breakwater damaged by storm of January 20, 1907; to complete the removal to a depth of 23 feet of the shoals outside north entrance to the harbor; and during the next fiscal year, or as soon thereafter as practicable, it is proposed to widen the Buffalo River entrance channel outside the piers to 400 feet, with a depth of 23 feet at mean lake level, and to remove a rock area at its inner end to same depth.

No estimate of funds is made for the fiscal year ending June 30, 1910, except to recommend, as authorized May 8, 1908, that a balance of $3,264.44 of the appropriation for improving Buffalo entrance to Erie Basin and Black Rock Harbor be reappropriated for improving harbor at Buffalo, N. Y., maintenance, the work being a part of the Buffalo breakwater system.

Money statement.

July 1, 1907, balance unexpended		$698,336.02
Received from sales		5.00
		698,341.02
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$16,441.33	
For maintenance of improvement	123,063.41	
		139,504.74
July 1, 1908, balance unexpended		558,836.28
July 1, 1908, amount covered by uncompleted contracts		368,311.98
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		3,264.44

ALLOTMENT AND APPROPRIATIONS.

May 26, 1826	$15,000.00	June 18, 1878	
May 19, 1828	34,206.00	March 3, 1879	
April 23, 1830	15,488.00	June 14, 1880	
March 2, 1831	12,900.00	March 3, 1881	
July 3, 1832	10,300.00	August 2, 1882	
March 2, 1833	31,700.00	July 5, 1884	
July 28, 1834	20,000.00	August 5, 1886	
July 7, 1838	68,500.00	August 11, 1888	
June 11, 1844	40,000.00	September 19, 1890	
August 30, 1852	14,000.00	July 13, 1892	
March 3, 1853	349.05	August 18, 1894	
March 2, 1855	452.32	June 4, 1897	
June 28, 1864	15,000.00	July 1, 1898	
July 2, 1864	37,500.00	March 3, 1899	
June 23, 1866	131,000.00	March 3, 1899	
March 2, 1867	100,000.00	March 3, 1901	
April 10, 1869	89,100.00	June 13, 1902	
July 10, 1870	80,000.00	June 28, 1902	
March 3, 1871	100,000.00	March 3, 1905	
June 10, 1872	75,000.00	March 3, 1905	
March 3, 1873	75,000.00	March 2, 1907	
February 23, 1874	20,000.00	Received from other s	
June 23, 1874	75,000.00		
March 3, 1875	100,000.00	Total	
August 4, 1877	85,000.00		

CONTRACTS IN FORCE.

FOR CONSTRUCTION OF STONE BREAKWATER, SOUTH CHANNEL ARM DATED MAY 31, 1906.

Name of contractor: Canal Quarry Company, Buffalo, N. Y.
Rates:
Rubblestone in place, per ton
Capping stone in place, per ton
Date of approval: June 14, 1906.
Date of commencement: July 16, 1906.
Date of completion: December 31, 1908.
Total amount of contract: $130,000.

FOR STONE-CONCRETE SUPERSTRUCTURE ON BREAKWATER AT BUI MAY 31, 1907.

Name of contractor: Great Lakes Construction Company, Buffa
Rates:
Tearing out old superstructure, per linear foot
Capping stone in place, per ton
Rubblestone in place, per ton
Concrete in place, per cubic yard
Date of approval: June 10, 1907.
Date of commencement: June 15, 1907.
Date of completion: December 31, 1909.
Total amount of contract: $259,148.80.

FOR REMOVING SHOALS OUTSIDE NORTH ENTRANCE TO BUFFALO H 14, 1907.

Name of contractor: Lake Erie Dredging Company, Buffalo, N
Rate: Excavation, per cubic yard, scow measure, $1.74.
Date of approval: June 28, 1907.
Date of commencement: June 17, 1907.
Date of completion: December 31, 1907.
Total amount of contract: $55,000.
Time limit waived.

COMMERCIAL STATISTICS.

[Compiled from records furnished by collector of customs and from annual report of the Chamber of Commerce of Buffalo, N. Y.]

Arrivals and departures of vessels for the year ending December 31, 1907.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Steam	2,896	6,566,679	363	324,209	2,998	6,786,136	290	176,664
Sail and barges	118	92,510	701	266,165	130	94,210	709	271,660
Total	3,014	6,659,189	1,064	590,374	3,128	6,880,346	999	448,324

Total arrivals and departures:

Number	8,205
Tonnage	14,578,233
Increase in tonnage 1907 over 1906	701,474

Amount of revenue collected, year 1907:

Lake commerce	$92,633.78
Rail commerce	$916,782.54
Total	$1,009,416.32

Value of imports:

By lake	$746,954.00
By rail	$7,386,908.00
Total	$8,133,862.00

Value of exports:

By lake	$1,391,272.00
By rail	$33,708,875.00
Total	$35,100,147.00

Enrolled tonnage, port of Buffalo ..... gross tons	203,302
Greatest draft of vessels ..... feet	20

New lines of transportation established: York Transit Company, Hope Transit Company, Rochester Steamship Company, Wyoming Steamship Company, Kensington Steamship Company.

Receipts by lake for the year 1907.

[Tons of 2,000 pounds.]

Article.	Quantity.	Article.	Quantity.
Barley	270,338	Oatmeal	1,396
Broom corn	222	Oil	80
Canned goods	3,480	Oil cake	28,529
Corn	797,377	Peas	8,382
Corn meal	1,596	Pelts	208
Cooper	79,880	Pork	179
Feed	118,586	Posts	753
Fish	482	Rags	1,386
Flaxseed	376,677	Rye	36,739
Flour	455,448	Seeds	6,377
Glucose	50,332	Shingles	40,230
Iron ore	5,372,810	Soap	604
Iron, pig	37,[illegible]	Spelter	1,[illegible]
Lard	766	Starch	2,[illegible]
Lath	668	Tallow	3,754
Lead, pig	83	Ties	2,339
Lumber	247,9[illegible]5	Wheat	1,999,7[illegible]4
Malt	6,471	Wool	7,729
Merchandise	264,794		
Nails	10	Total	10,928,342
Oats	180,3[illegible]6		

Shipments by lake for the year 1907.

[Tons of 2,000 pounds.]

Coal.....
Cement.....
Railroad iron.....
Salt.....
Sugar.....
Unclassed (merchandise)[a].....

Total.....

The following statistics of the canal commerce of Buffalo for the nished by the State superintendent of public works:

Canal clearances.....
Freight received, Buffalo.....
Freight shipped, Buffalo.....
Steamers and canal boats navigating from Buffalo on canal, about..
Average freight rate, Buffalo to New York, for wheat, per bushel ...

Assuming that the number of arrivals of canal boats equaled the ances, the grand total of the commerce of Buffalo by lake and can year 1907 is as follows:

	Arrivals and departures.
Lake.....	8,205
Canal.....	5,014
Total.....	13,219

Total receipts and shipments, 18,429,695 tons.

Q Q 4.

IMPROVEMENT OF LAKE ERIE ENTRANCE TO BLACI AND ERIE BASIN, NEW YORK.

REPORT OF OPERATIONS.

Work of excavation, under contract with the Company, continued slowly during the year.

This work should have been completed Decembe time limit was waived for a reasonable period an be completed in 1908.

Two drill boats were engaged in drilling and l July and August, 1907, and for a few days in O boat was placed on the work May 20 and two m working during favorable weather to the end of

One dredge worked from August 16 to Septem placed on the work June 4, 1908, and continue fiscal year. A second large dredge began wor continued to the close of the fiscal year.

During the fiscal year 20,882 cubic yards o were removed from the channel section and 35 measure, of sand and rock from the basin sect

a From Monthly Summary of Commerce and Financ Department of Commerce and Labor.

There remains the excavation of about 21,000 cubic yards of sand and rock in the channel section and 38,000 cubic yards of rock in the basin section and "cleaning up" to complete the work.

A survey of the excavation completed in 1907 was made February, 1908, and showed an excavation more than that previously estimated for in monthly payments amounting to $35,813.76. This amount will be paid to the contractors under paragraph 80 of the specifications.

PROPOSED OPERATIONS AND REMARKS.

The work of excavation will be continued under the contract and the improvement completed during the next fiscal year. All the funds authorized for this work have been appropriated.

Money statement.

July 1, 1907, balance unexpended	$225,666.99
June 30, 1908, amount expended during fiscal year, for works of improvement	52,638.90
July 1, 1908, balance unexpended	173,028.09
July 1, 1908, amount covered by uncompleted contracts	172,543.37

APPROPRIATIONS.

June 13, 1902	$200,000
March 3, 1903	200,000
April 28, 1904	125,000
March 3, 1905	52,000
June 30, 1906	237,643
Total	814,643

CONTRACT IN FORCE.

CONTRACT FOR EXCAVATION IN LAKE ERIE ENTRANCE TO BLACK ROCK HARBOR AND ERIE BASIN, NEW YORK, DATED FEBRUARY 16, 1903.

Name of contractor: Buffalo Dredging Company.

Rates:

Excavation of channel, per cubic yard, place measurement	$0.66
Excavation of basin, per cubic yard, place measurement	1.84
Placing rock with derrick, per ton	1.25

Date of approval: March 3, 1903.
Date of commencement: April 29, 1903.
Date of expiration: December 31, 1906.
Time limit waived.

COMMERCIAL STATISTICS.

For the commercial statistics relating to this work reference is made to the statistics of Buffalo Harbor. There are no means of separating the statistics relating to the portion of the harbor covered by this improvement from the general statistics of the harbor.

Q Q 5.

IMPROVEMENT OF BUFFALO ENTRANCE TO ERIE ROCK HARBOR, NEW YORK (NORTH BRE

A full description of the locality and a discussic the work is printed, with map, in House Documen Congress, first session, and in Report of the Chief of page 3245 et seq., and a history of the work and it Report of the Chief of Engineers for 1901, page 3:

There were no operations during the past fiscal breakwater is in good condition.

REMARKS.

This breakwater is the most northerly section system protecting Buffalo Harbor.

It is recommended, as authorized May 8, 1908, available be reappropriated for improving harbo and that the completed breakwater be hereafter n latter appropriation and dropped as a separate w

Money statement.

July 1, 1907, balance unexpended	
July 1, 1908, balance unexpended	

APPROPRIATIONS.

March 3, 1899	
June 6, 1900	
Total	

COMMERCIAL STATISTICS.

For the commercial statistics relating to this work reference of Buffalo Harbor. There are no means of separating the portion of the harbor covered by this improvement from the harbor.

Q Q 6.

IMPROVEMENT OF BLACK ROCK HARBOR AND CH

REPORT OF OPERATIONS.

The first appropriation for this work was made a contract was made with the Empire Enginee New York, February 1, 1906, for the excavatio feet, more or less, of the channel.

Under the terms of this contract the work should have been commenced on or before April 8, 1906, but was not commenced until November, 1906.

At the beginning of the fiscal year little progress had been made, the constant breaking down of the two Lobnitz machines with which the rock is to be broken up delaying the work.

Work was carried on during the fiscal year with two rock breakers and one dredge working from July 1 to December 7, 1907, and from April 17 to June 30, 1908. Slow progress was made due to breakdowns of plant, and it is evident that the rock can not be broken fast enough with the Lobnitz rock breakers to comply with the terms of the contract.

During the fiscal year 138,990 cubic yards of material overlying bed rock and 15,551 cubic yards of rock, place measure, were excavated. No part of the channel is completed.

A survey of the excavation completed in 1907 was made February, 1908, and showed an excavation more than that previously estimated for in monthly payments amounting to $13,586.92. This amount had been paid to the contractors under paragraph 70 of the specifications.

At a uniform rate of progress the contractors should have earned $554,167. The actual earnings were $91,101.07.

A second contract for the excavation of 3,400 linear feet, more or less, of the channel, in extension of that covered by the above-mentioned contract, was made with the Buffalo Dredging Company July 12, 1907, the total amount of contract being $820,640.

Under this contract work was commenced August 28, 1907, with 4 drill boats, drilling and blasting rock, and 2 dredges, and continued to January 22, 1908; resumed March 19 and continued to the close of the fiscal year. The plant employed varied from time to time.

Good progress was made and at the close of the fiscal year 34,469 cubic yards, place measure, of material overlying bed rock, 31,002 cubic yards, place measure, of bed rock, and 2,950 linear feet of canal wall had been removed. No part of the channel is fully completed.

A contract for construction of cofferdam and concrete lock walls for ship lock was made April 15, 1908, with the MacArthur Brothers Company, the total amount being $823,304.45.

Under this contract the work of driving steel sheet piling for cofferdam was begun April 22, 1908.

Excavation to bed rock for the lock foundation was begun by a dredge on June 10, 1908, and dredging of a 10-foot channel for navigation around the cofferdam on June 26. At the close of the fiscal year the steel piling for the east wall of the cofferdam, 947 feet long, had been driven nearly complete, excavation fairly begun, and the channel half completed.

The filling with stone of a gap 300 feet long, made by storm of October 27, 1906, in Bird Island pier, and placing a deck of large stone on 2,000 feet of the pier south of the gap to its south end, was completed December, 1907, at a total cost of $3,581.25 for replacing filling stone washed out by sea and placing large stone taken from the canal wall under the Buffalo Dredging Company contract.

PROPOSED OPERATIONS AND REMARKS.

During the next fiscal year work under contracts will be continued.

If the money is earned as required by contract specifications up to June 30, 1910, $800,000 will be needed to meet payments on existing contracts.

It is expected that the construction of the walls for the ship lock will progress at a rate that will admit of entering into a contract for the lock gates and machinery not later than January, 1910. This will require $200,000 additional.

It is therefore recommended that the balance of the funds authorized by river and harbor act of March 2, 1907, viz, $1,000,000, be appropriated in the next sundry civil act.

Further work on the project, notably the construction of a new bridge at Ferry street, Buffalo, and the excavation of the channel of the project in Niagara River below the ship lock, can be advantageously begun in 1910. These two items are estimated to cost $600,000.

It is therefore recommended that the balance of the money required for the completion of the project, viz, $1,800,000, be authorized and $600,000 of this amount appropriated in the next river and harbor act, "to include the construction of a new bridge at Ferry street and the excavation in the east channel of the Niagara River from the foot of the ship lock to the natural deep-water harbor 2½ miles downstream."

Money statement.

July 1, 1907, balance unexpended	$1,684,819.97
Received from sales and collections	321.25
	1,685,141.22
June 30, 1908, amount expended during fiscal year for works of improvement	215,478.87
July 1, 1908, balance unexpended	1,469,662.35
July 1, 1908, amount covered by uncompleted contracts	2,111,954.57
Amount (estimated) required for completion of existing project	2,800,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	1,600,000.00

APPROPRIATIONS.

March 3, 1905	$100,000.00
June 30, 1906	233,000.00
March 2, 1907	1,000,000.00
March 4, 1907	367,000.00
Sales and collections	321.25
Total	1,700,321.25

CONTRACTS IN FORCE.

FOR EXCAVATION IN BLACK ROCK HARBOR, NEW YORK, DATED FEBRUARY 1, 1906.

Name of contractor: Empire Engineering Corporation, New York.

Rates:

Removing material overlying bed rock, per cubic yard, place measure	$0.33
Removing bed rock, per cubic yard, place measure	1.85
Removing partition wall, per linear foot	9.00
Handling rock with derrick, per ton	.90

Date of approval: March 6, 1906.
Date of commencement: November 5, 1906.
Date of expiration: December 31, 1908.

FOR EXCAVATION IN BLACK ROCK HARBOR, NEW YORK, DATED JULY 12, 1907.

Name of contractor: Buffalo Dredging Company, Buffalo, N. Y.

Rates:

For excavating and removing material overlying bed rock, per cubic yard, place measure	$0.28
Excavating and removing bed rock, per cubic yard, place measure	2.70
Handling and placing excavated rock with derrick, per ton	1.25
Removing partition wall, per linear foot	8.00

Date of approval: July 25, 1907.
Date of commencement: August 28, 1907.
Date of expiration: December 31, 1910.

FOR CONSTRUCTING COFFERDAM AND LOCK WALLS IN BLACK ROCK HARBOR, NEW YORK, DATED APRIL 15, 1908.

Name of contractor: MacArthur Brothers Company, New York.

Rates for building cofferdam:

Steel sheet piling, per ton of 2,000 pounds	$53.00
Steel waling and braces, per pound	.05
Clay filling, per cubic yard, place measure	.45
Clay banking, per cubic yard, scow measure	.35
Pumping and maintenance, for all	8,000.00

Rates for building lock walls:

Excavation, per cubic yard, place measure	.19
Handling and placing excavated material, by derrick, per cubic yard, bucket measure	.40
Dredging channel, per cubic yard, scow measure	.16
Concrete, per cubic yard	4.37
Granite for quoins, per cubic yard	60.00
Steel culvert, 72-inch, per linear foot	15.65
Steel culvert inlets, 30-inch, per linear foot	8.65
Steel culvert branches, 18-inch, per linear foot	6.65
Steel pump well pipes, 30-inch, per linear foot	8.65
Steel drain pipe, 18-inch, per linear foot	6.65
Steel I-beams and channels, per pound	.05
Wrought iron or steel lap welded cable pipes, per pound	.10
Cast steel bases, per base	100.00
Steel eye bars, per bar	65.70
Anchorage bolts, per pound	.05
Mooring posts, per post	40.00
Mooring cleats, per cleat	25.00

Date of approval: May 25, 1908.
Date of commencement: April 22, 1908.
Date of expiration: June 30, 1912.

COMMERCIAL STATISTICS.

For commercial statistics see report on Buffalo Harbor and on Tonawanda Harbor and Niagara River, New York.

QQ 7.

IMPROVEMENT OF TONAWANDA HARBOR AN NEW YORK.

REPORT OF OPERATIONS.

An appropriation of $3,000 was made by the of March 2, 1907, for removing the wrecked stea Niagara River near the Grand Island shore, a Tonawanda.

Contract was made with William Anderson, o 13, 1907, for its removal. At the beginning o work was in progress and was completed July 2 cluding contingencies and inspection, of $2,920.2

No other work was done during the year.

PROPOSED OPERATIONS AND REM

No work is proposed for the next fiscal year.

The project is completed, except at the Buffa pier, where the width of the channel is about 1 Tonawanda Iron and Steel Company's docks to t Tonawanda, where the depth is from 12 to 15 fe

Further work at these points is not urgent, an on hand for emergencies.

Money statement.

July 1, 1907, balance unexpended	
Received from collections	
June 30, 1908, amount expended during fiscal year, for n improvement	
July 1, 1908, balance unexpended	

APPROPRIATIONS.

August 11, 1888	$100,000.00	March 3, 1899	
September 19, 1890	75,000.00	June 13, 1902	
July 13, 1892	75,000.00	March 2, 1907	
August 18, 1894	50,000.00	Collections	
June 3, 1896	50,000.00		
		Total	

CONTRACT IN FORCE.

FOR REMOVING WRECK OF STEAMER EMBURY FROM NIA DATED MAY 13, 1907.

Name of contractor: William Anderson, Buffalo, N. Y.
Rate: For complete removal, $2,655.
Date of commencement: May 16, 1907.
Date of expiration: July 2, 1907.

COMMERCIAL STATISTICS.

[Furnished by the collectors of customs, Buffalo Creek and Niagara districts.]

Arrivals and departures of vessels for the year ending December 31, 1907.

District and vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Buffalo Creek:								
Steam	39	22,456	9	6,278	39	23,158	3	543
Sail and barges	27	17,569	18	7,319	36	21,793	2	823
Niagara:								
Steam	283	236,607	58	28,744	311	238,771	29	13,408
Sail and barges	231	145,638	78	37,526	275	168,313	37	16,113
Total	580	422,270	163	79,867	661	452,035	71	30,887

Total arrivals and departures:	
Number	1,475
Tonnage	985,059
Decrease in tonnage, 1907 under 1906 ... tons	132,707
Amount of revenue collected, year 1907, on lake commerce	$195,109.21
Value of imports by lake, year 1907	$2,002,975.00
Value of exports by lake, year 1907	None.
Enrolled gross tonnage, Niagara district, 1907	61,769
Greatest draft of vessels ... feet	15½

Receipts by lake and river.

[Tons of 2,000 pounds.]

	1906.	1907.		1906.	1907.
Emery and electrite	260	1,033	Posts	7,077	2,329
Pulp wood	4'0	.....	Railroad ties	225	14,781
Iron ore	265,820	305,374	Shingles	465	0.4
Lath	1,171	1,824			
Lumber	776,332	580,128	Total	1,063,830	905,469.4
Pig iron	12,000	.....			

Shipments by lake and river	None.
Shipments by Erie Canal [a] ... tons	206,017
Lumber shipments by Erie Canal (included in above) ... feet B. M.	98,641,537
Receipts by Erie Canal [a] ... tons	50,289

Number of vessels passing International Bridge, Niagara River, 1907.

[Furnished by R. J. McMurray, captain of the tug *International*.]

Steamers	3,748
Other vessels	1,333
Total	5,081
Season of navigation, April 1, 1907 to January 5, 1908 ... days	280
Number of times bridge draw was opened during season	2,925
Average number of times bridge draw was opened per day	10.45

[a] Furnished by State superintendent of public works.

APPENDIX R R.

IMPROVEMENT OF RIVERS AND HARBORS IN THE OSWEGO, NEW YORK, DISTRICT.

REPORT OF LIEUT. COL. W. L. FISK, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Harbor at Charlotte, New York.
2. Harbor at Pultneyville, New York.
3. Harbor at Great Sodus Bay, New York.
4. Harbor at Little Sodus Bay, New York.
5. Harbor at Oswego, New York.
6. Harbor at Cape Vincent, New York.
7. Harbor at Ogdensburg, New York.

(For letter of transmittal see Appendix Q Q.)

R R 1.

IMPROVEMENT OF HARBOR AT CHARLOTTE, NEW YORK.

REPORT OF OPERATIONS.

The act of March 2, 1907, appropriated $88,500 for rebuilding piers and maintenance of channel at Charlotte. A project for rebuilding 1,300 feet of the east pier was submitted, and approved March 26, 1907.

Under this project materials were purchased, and the work started April 1, 1907.

At the beginning of the fiscal year the work of reconstructing crib substructure and replacing the timber superstructure with concrete was under way with hired labor; the work being done in the manner described on page 1942, Report of the Chief of Engineers for 1906.

The old timber crib substructure was removed by the United States dredge *Frontenac*, new cribs built and sunk in place, and concrete superstructure, consisting of concrete blocks for side walls and mass concrete for decks, placed on the new foundation.

Work was continued in 1907 to December 10, and then suspended for the winter. Two hundred and seventy linear feet of pier had then been finished and 800 linear feet of new cribs sunk ready for concrete superstructure.

During the winter, repairs were made to the derrick scow and dredge *Frontenac*.

Work on east pier was resumed in April, 1908, and a
e fiscal year, 240 linear feet of old crib substructu
moved by the U. S. dredge *Frontenac*, 200 linear feet
ınk in place, and a crib 100 feet long built ready to sinl
The construction of concrete blocks for the new super
esumed in June, 1908, and 8 blocks—80 linear feet—ma
ɔn cribs up to the close of the fiscal year.

U. S. dredge *Frontenac* began the work of redredgin
where required to restore depth of 16½ feet at low wa
1907, the dredging to be done in connection with wor
the dredge on the pier repairs. Dredging was continue
1907; resumed November 2, and continued to Decen
when laying up dredge for the winter was begun and
December 10.

During the season the channel, between the piers,
where required, for a length of 3,150 feet, station 7 to st
and width of 80 feet; dredged 10,835 cubic yards sco
sand, at a cost of $1,774.03.

PROPOSED OPERATIONS AND REMARKS.

Charlotte is the lake port of Rochester and has a la
in coal, brought by rail from Pennsylvania mines and
the St. Lawrence River and to Canadian ports on Lake
Its commerce is growing, and the maintenance of its
full extent of the project is advisable.

The channel maintained between the piers and to dee
lake is 3,800 feet long, and requires redredging annua
of filling, caused by deposit during high water in the
of material in suspension, and also because of sand d
channel from the lake.

The crib substructure underlying about 2,900 feet
built in 1829–1834, and is of such poor construction t
timbers are gradually being washed out to the depth
below water, placing the piers in a dangerous condit
The timber superstructure of the piers is also beco
rotten.

It is proposed during the season of 1908 to co
1,300 feet of the east pier, for which funds are on
There will yet remain 300 linear feet at the inr
pier having 1829–1834 substructure to rebuild at
of $60 per linear foot, or $18,000, and 868 linear f
and 870 of the west pier on which the decayed ti
should be replaced with concrete as soon as pr
mated cost of $30 per linear foot, or $52,140; to
Maintenance of the channel to June 30, 1910, is
The total amount required and recommended
the next river and harbor act is therefore, inclu
contingencies, $80,000.

Money statement.

July 1, 1907, balance unexpended	$84,420.10
Received from sales and collections	45.46
	84,465.56
June 30, 1908, amount expended during fiscal year for maintenance of improvement	47,299.24
July 1, 1908, balance unexpended	37,166.32
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	80,000.00

APPROPRIATIONS.

May 23, 1828	$300.00	June 18, 1878	$1,000.00
March 2, 1829	10,000.00	March 3, 1879	1,000.00
March 3, 1829	13,335.00	June 14, 1880	5,000.00
March 2, 1831	16,670.00	March 3, 1881	2,500.00
February 24, 1832	16,000.00	August 2, 1882	35,000.00
March 2, 1833	15,000.00	July 5, 1884	20,000.00
June 28, 1834	20,000.00	August 5, 1886	26,250.00
March 3, 1835	2,390.00	August 10, 1888	45,000.00
July 2, 1836	20,000.00	September 19, 1890	25,000.00
March 3, 1837	10,000.00	July 13, 1892	25,000.00
July 7, 1838	25,000.00	August 18, 1894	15,000.00
June 11, 1844	10,000.00	June 3, 1896	12,000.00
August 20, 1852	20,000.00	March 3, 1899	7,000.00
March 3, 1853	176.10	June 6, 1900	3,500.00
June 28, 1864	25,000.00	June 13, 1902	30,000.00
June 23, 1866	75,607.30	April 28, 1904	[a] 23,000.00
July 25, 1868	1,100.00	March 3, 1905	80,000.00
April 10, 1869 (allotment)	1,000.00	March 2, 1907	88,500.00
July 11, 1870	12,000.00	Sales	45.46
March 3, 1871	10,000.00		
March 3, 1875	5,000.00	Total	753,373.86

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending December 31, 1907.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Steam	216	164,913	631	726,519	218	163,103	642	734,307
Sail and barges	25	10,494	148	53,561	15	4,315	162	64,351
Total	241	175,407	779	780,080	233	167,418	804	798,658

[a] Returned to Treasury, $1,209.07.

l arrivals and departures (tonnage, 1,921,563).....
ease of tonnage, 1907 over 1906.....
ount of revenue collected, year ending December 31, 1907....
ue of imports, year ending December 31, 1907.....
ue of exports, year ending December 31, 1907.....
eatest draft of vessels.....fe
rolled tonnage, port of Charlotte.....net to

Receipts by lake.

[Net tons.]

Articles.	1903.	1904.	1905.
Poles and railroad ties	406	449	.....
Lumber	707	167	
Posts, logs, and pulp wood	5,215	4,318	3,6
Lath	181	46	
Shingles	75	21	.....
Merchandise	1,774	52	1
Feldspar	.....	4,907	6,7
Total	8,358	9,960	10,7

Shipments by lake.

[Net tons.]

Articles.	1903.	1904.	1905.
Coal	560,081	543,851	586,8
Oils and merchandise	730	401	4
Total [a]	560,811	544,252	587,2

[a] Shipments were also made of miscellaneous merchandise, consisting of photo to the value of $61,453.

R R 2.

IMPROVEMENT OF HARBOR AT PULTNEYVILLI

REPORT OF OPERATIONS.

No work had been done at this harbor since 1 had filled so that the depth was from 3 to 4 fee the piers were in poor condition.

Under the approved project for repairs to pie the channel, timber for repairs was purchased, of the fiscal year the work had been commenc

Repairs to the piers consisted of removing deck plank and wall timbers and deck joists wl in driving 81 sheet piles in the inner face of piles were 16 feet long, and penetrated sand ar feet.

Four tie-rods were placed to bind the supers

Used in the work: 35,580 feet B. M. hem 1,592 pounds bolts and spikes.

The repairs placed both piers in fair cond

The depth of water in the channel was or could be obtained to excavate the channel a trifugal pump, operated by steam, was ins the purpose.

The pump was operated, discharging sand behind the west pier, in August and September, and a channel made having a least depth of 8 feet, 14 feet wide, from the lake to the creek, which is believed to be sufficient for boats using this harbor.

Operations were completed October 19, 1907, at a cost of $3,071.39, and the pile driver and pump shipped to Oswego.

An examination of the piers was made April 15, 1908, and arrangements made for further repairs.

Owing to the high stage of water in Lake Ontario, the repairs had not been commenced at the close of the fiscal year.

PROPOSED OPERATIONS AND REMARKS.

Repairs will be made to the piers to the extent admissible with the funds available.

No estimate of funds for the fiscal year ending June 30, 1910, is made in this report.

The commerce of Pultneyville Harbor is insignificant.

Money statement.

July 1, 1907, balance unexpended	$5,988.16
June 30, 1908, amount expended during fiscal year for maintenance of improvement	3,576.00
July 1, 1908, balance unexpended	2,412.16

APPROPRIATIONS.

July 11, 1870	$5,000	March 3, 1881	$2,000
March 3, 1871	5,000	August 2, 1882	4,000
June 10, 1872	10,000	September 19, 1890	2,000
March 3, 1873	10,000	July 13, 1892	1,000
June 23, 1874	10,000	August 17, 1894	1,500
March 3, 1875	10,000	June 3, 1896	1,500
August 14, 1876	3,000	March 3, 1899	2,000
June 18, 1878	5,000	March 2, 1907	6,000
March 3, 1879	4,000		
June 14, 1880	3,000	Total	85,000

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending December 31, 1907.

Vessels.	Arrivals from—				Departure to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Sail and steam	1	6	1	50	1	6	1	50

Total arrivals and departures (tonnage, 112)	4
Amount of revenue collected for year 1907	$52.80
Value of imports, year ending December 31, 1907	$588.00
Receipts by lake: Cedar posts, laths, and shingles ... tons	77
Enrolled tonnage, port of Pultneyville	None.
Greatest draft of vessels ... feet	6

R R 3.

IMPROVEMENT OF HARBOR AT GREAT SODUS BAY, NEW YORK.

REPORT OF OPERATIONS.

Repairs were made to superstructure of the west pier at the old light-house crib October 25–December 7, 1907. These repairs consisted in closing one opening in the west wall with 12 pieces of timber and two other openings, each 30 feet long, with timber bulkheads extending 4 feet below water, to prevent the stone filling from being washed out until more permanent repairs could be made in the spring.

Repair work was resumed April 13, 1908. The timber bulkheads at the old light-house crib in the west pier were completed, and 77 cubic yards of stone filling placed in the crib and new deck placed. Seventeen cubic yards of stone filling were placed in the outer end of west pier. On east pier 20 linear feet of bulkhead was placed on west face 550 feet north of the elbow.

Repairs were completed May 20, 1908, at a cost of $1,696.30 fr labor and materials.

An examination of the channel was made August 19–24, 1907, it was found to have a least depth of 12½ feet, low water, as Oswego gauge, for least width of 100 feet.

No dredging of channel was done during the fiscal year.

PROPOSED OPERATIONS AND REMARKS.

The channel to be maintained is 1,800 feet long and 150 from the bay to the 15-foot curve in Lake Ontario, and requ or less dredging annually on account of shoaling, caused drifting in from the lake. There are 2,150 feet of break 2,874 feet of piers to be maintained. These are old structures in an advanced stage of decay, and require c extensive repairs to maintain them. They should all b concrete superstructure in the near future.

The river and harbor act of March 2, 1907, appropriat work at this harbor, and project for rebuilding with c structure about 584 feet of the west pier and 854 feet c at an estimated cost of $42,500, was approved Marc work to be done with hired labor and plant now on ha at Charlotte Harbor, on completion of work there. begin this work during the coming fiscal year, and the channel when necessary with the funds on hand.

No estimate of funds for the fiscal year ending considered necessary.

The commerce of Great Sodus Bay is not large, the shipment of coal brought from Pennsylvania

Money statement.

July 1, 1907, balance unexpended	
June 30, 1908, amount expended during fiscal year for main provement	
July 1, 1908, balance unexpended	

APPROPRIATIONS.

March 2, 1829	$12,500.00	March 3, 1879	$2,000.00
March 3, 1829	15,280.00	June 14, 1880	3,000.00
March 2, 1831	17,450.00	March 3, 1881	5,000.00
February 24, 1832	17,000.00	August 2, 1882	25,000.00
March 2, 1833	15,000.00	July 5, 1884	10,000.00
June 28, 1834	15,000.00	August 5, 1886	16,875.00
March 3, 1835	11,790.00	August 10, 1888	24,000.00
July 2, 1836	12,600.00	September 19, 1890	10,000.00
March 3, 1837	12,000.00	July 13, 1892	15,000.00
July 7, 1838	10,000.00	August 18, 1894	15,000.00
June 11, 1844	5,000.00	June 3, 1896	8,000.00
August 20, 1852	10,000.00	March 3, 1899	14,000.00
June 23, 1866	53,151.80	July, 1899 (repayment)	1.00
March 2, 1867	80,000.00	June 13, 1902	5,000.00
July 11, 1870	5,000.00	June 13, 1902 (allotment)	1,250.00
June 10, 1872	15,000.00	March 3, 1905 (allotment)	1,588.00
June 23, 1875	15,000.00	March 2, 1907	50,000.00
March 3, 1875	10,000.00		
August 14, 1876	5,000.00	Total	547,485.80
June 18, 1878	5,000.00		

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending December 31, 1907.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Steam	16	2,544	80	13,265	6	651	90	15,032
Sail and barges	15	4,449	103	18,250	13	3,273	107	20,593
Total	31	6,993	183	31,515	19	3,924	197	35,625

Total arrivals and departures (tonnage, 78,057)	430
Increase of tonnage, 1907 over 1906	13,577
Amount of revenue collected, year ending December, 31 1907	$80.35
Value of imports, year ending December 31, 1907	$13,777.20
Value of exports, year ending December 31, 1907	$180,457.00
Greatest draft of vessels ..... feet	12
Enrolled tonnage	None.

Receipts and shipments by lake.

[Net tons.]

Articles.	Receipts.			Shipments.		
	1905.	1906.	1907.	1905.	1906.	1907.
Coal				42,697	53,740	67,728
Merchandise				7		
Feldspar	3,507	5,154	3,423			
Miscellaneous	40		6		11	
Total	3,547	5,154	3,429	42,704	53,751	67,728

R R 4.

IMPROVEMENT OF HARBOR AT LITTLE SODUS BAY, NEW YORK.

REPORT OF OPERATIONS.

An appropriation of $75,000 was made by the river and harbor act of March 2, 1907, for work at this harbor, and project for replacing with concrete all the timber superstructure on the west pier, 1,747 feet, and 461 feet of the east pier, at an estimated cost of $70,000, was approved March 25, 1907, the work to be done by hired labor and United States plant.

Materials were purchased, and at the beginning of the fiscal year the work had been started.

On the west pier work was begun at the outer beacon, 30 feet from the lake end of the pier, and the removal of the old timber superstructure to low-water level carried thence southward. The crib substructure was leveled to the required grade of low water; concrete blocks made—face-wall blocks 3 feet 9 inches by 3½ feet by 10 feet long, cross-wall blocks 4 feet by 3½ feet by 6 feet 2 inches long—and the blocks set in place on the prepared crib substructure; filling stone replaced between the walls of concrete blocks and a concrete deck 1 to 2 feet thick laid over all, in sections 30 feet long. The crest of concrete deck is 7 feet above low water and 4.6 feet above mean level.

High seas November 1 to 10, 1907, washed 16 face-wall blocks the east and west piers into the lake. Fifteen blocks were rec in June, 1908.

At the close of operations for the season, November 22, 1 linear feet of concrete superstructure had been completed ar superstructure removed for 176 feet farther.

On the east pier work was similarly carried on, beginn south end of concrete superstructure placed in 1905 and south. At the close of the season of 1907, 120 linear feet superstructure had been completed.

Operations on the piers were resumed May 21, 1908. in Lake Ontario, the mean level for May being 4.34 f water, 1.91 feet above mean lake level, greatly increase of the work.

At the close of the fiscal year the removing of old structure and filling stone on sections of both piers begun, materials for concrete collected, and nine making concrete blocks.

No dredging was done in the channel during the

An examination of the channel was made Augu and it was found to have a least depth of 13 feet least width of 100 feet from lake to bay. The pr gave more than 15 feet depth at all times.

Minor repairs made during the fiscal year co cubic yards of filling stone in the outer end of pairing the deck, October, 1907, and repairing pier wall at the elbow with old timber and pla yards of gravel as pier filling, May, 1908.

PROPOSED OPERATIONS AND F

The entrance channel is 2,300 feet in ler 15-foot curve in the lake. It requires mor

on account of shoaling, caused chiefly by the drifting of sand from the west.

Maintenance of the channel by dredging is estimated to cost $2,500 per annum, $5,000 for two years.

The decayed superstructure on all of the west pier and on all but 414 feet of the east pier is being rebuilt with concrete superstructure with funds on hand. The cost of rebuilding this 414 feet is estimated at $14,000, including contingencies. It is recommended that this amount be provided, so that the placing of the piers in a permanent form may be completed.

The east breakwater, 1,680 feet long, was rebuilt with timber in 1889–1891. It is becoming much decayed, but can be repaired with timber at a cost of $6,000, including contingencies, so that the timber structure will endure for at least ten years longer.

The recommendations for the next fiscal year are summarized as follows:

To be appropriated—maintenance:	
For channel	$5,000
For piers and breakwater	20,000
Total	25,000

It is proposed during the next fiscal year to continue the replacing of timber superstructure with concrete, by hired labor, with funds on hand, and to dredge the channel when required.

The commerce of this port consists chiefly of shipments of coal brought by rail from Pennsylvania mines destined to Canadian ports on Lake Ontario and the St. Lawrence River.

Money statement.

July 1, 1907, balance unexpended	$74,145.19
June 30, 1908, amount expended during fiscal year for maintenance of improvement	13,090.13
July 1, 1908, balance unexpended	61,055.06
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	25,000.00

APPROPRIATIONS.

August 30, 1852	$10,000.00	March 3, 1881	$20,000.00
April 9, 1864	1,778.36	August 2, 1882	25,000.00
April 9, 1864	2,224.00	July 5, 1884	10,000.00
April 9, 1864	99.00	August 5, 1886	12,500.00
June 23, 1866	33,840.41	August 10, 1888	16,000.00
March 2, 1867	50,000.00	September 19, 1890	13,000.00
April 10, 1869	1,500.00	July 13, 1892	6,000.00
July 11, 1870	5,000.00	August 18, 1894	8,000.00
March 3, 1871	15,000.00	June 3, 1896	8,000.00
June 10, 1872	15,000.00	March 3, 1899	5,500.00
March 3, 1873	15,000.00	June 13, 1902	25,000.00
June 23, 1874	15,000.00	June 13, 1902 (allotment)	[a] 2,000.00
March 3, 1875	10,000.00	March 3, 1905	30,000.00
August 14, 1876	5,000.00	March 2, 1907	75,000.00
June 18, 1878	10,000.00	Repayments	21.00
March 3, 1879	5,000.00		
June 14, 1880	20,000.00	Total	470,462.77

[a] Returned to Treasurer $1,179.04.

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending December 31, 1907.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign port	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	To
Steam	39	5,430	54	11,254	24	2,560	72	1
Sail and barges	23	8,329	105	28,586	11	3,227	121	3
Total	62	13,759	159	39,840	35	5,787	193	4

Total arrivals and departures (tonnage, 108,804)
Increase of tonnage, 1907 over 1906
Amount of revenue collected, year ending December 31, 1907 $233
Value of imports, year ending December 31, 1907 $3,265
Value of exports, year ending December 31, 1907 $383,945
Greatest draft of vessels feet
Enrolled tonnage No

Receipts and shipments by lake.

[Net tons.]

Articles	Receipts.			Shipments.		
	1905.	1906.	1907.	1905.	1906.	19
Coal				105,026	102,110	9
Posts and wood	262	279	780			
Fish and miscellaneous	1			9	9	
Lumber and shingles		23	1,088			
Ice		1,400				
Hay		170				
Total	263	1,872	1,868	105,035	102,119	

R R 5.

IMPROVEMENT OF HARBOR AT OSWEGO, NEW YORK.

REPORT OF OPERATIONS.

At the beginning of the fiscal year repairs to the outer br where damaged by storms in January and February, 1 decayed, were in progress under the old plan of mainta structure with timber superstructure, known as plan "B repairs were made to save the damaged and decayed parts plete destruction before they could be reached under t plan of rebuilding with stone superstructure.

Repairs extended over the main part of the breakw gap to the breakwater light, a length of about 4,000 f sisted of replacing wall timbers, deck joists, and deck p the parapet and banquette where needed, adding fillin washed out, and strengthening the back wall of the posts where needed.

A storm on July 26–27, 1907, damaged the spur cr repairs were made by placing vertical timbers in th on September 24–26 again damaged the

Damaged crib superstructure at station 7 was repaired by divers. These repairs were completed December 20, 1907, at a cost of $16,574.57 for labor and materials, and placed the main breakwater in fair condition to withstand winter storms.

Repairs with timber to the deck and wall timbers where decayed on 250 feet of the inner breakwater, from the stone pier to the gap, were made in July, 1907, at a cost of $627.01 for labor and materials.

The river and harbor act of March 2, 1907, authorized a change in plan for repairing the outer breakwater to that known as plan "A," and printed on page 3368, Report of the Chief of Engineers for 1904.

This plan contemplates a stone-concrete superstructure in place of the present timber superstructure.

A project for rebuilding 1,175 linear feet extending east from the gap under plan "A" was approved March 26, 1907, and proposals for the work were opened June 6, 1907. One proposal was received, and upon the recommendation of this office was rejected as excessive.

A modification, contemplating first placing a heavy riprap along the lake face of the breakwater where most needed to protect cribs and at the same time forming the foundation for the sea slope of plan "A," and building a stone superstructure over the crib placed in the breach made by storm of February 2–3, 1907, was approved June 17, 1907.

Proposals for stone were invited June 20 and opened July 5, 1907. Four bids were received and all were rejected as excessive, upon recommendation from this office.

A third attempt was made; proposals invited July 17 and opened August 17, 1907. Two bids received and both rejected as excessive, upon recommendation from this office.

Arrangements were then made for purchasing limestone in blocks weighing 1 to 5 tons each, averaging not less than 2 tons, and placing it as riprap with United States plant and hired labor. The first lot of stone was received from quarries at Chaumont, N. Y., September 16, 1907, and up to the close of operations in November 3,723 tons had been purchased and placed as riprap along the lake face, from the gap to the breakwater light, where most needed to protect the crib superstructure.

It being apparent that no satisfactory bids could be obtained for rebuilding the breakwater under plan "A" by contract, arrangements were made and approved for continuing the work on a larger scale with United States plant and hired labor. The construction of two scows, each 130 by 36 by 9 feet and of about 600 tons capacity, for transporting large stone from the quarries at Chaumont, and of a derrick scow was begun in December, 1907. The scows were completed in May, 1908, when operations were resumed, using the new scows for transporting stone, with a tug chartered for towing them between Oswego and Chaumont.

The stone is unloaded from the scows by the new derrick scow, which is equipped with a boom long enough to swing the stone over the breakwater and deposit it as riprap and a core for the stone sea slope of plan "A."

During May and June, 1908, 1,431.9 tons of rubblestone and 356 tons of capping stone were transported from Chaumont and placed along the lake face of the breakwater, making the total amount of stone placed during the fiscal year 5,154.9 tons of rubblestone and

56 tons of capping stone. The stone has proved to be a good protection to the crib substructure.

No dredging was done in the channels or harbor basins during the fiscal year.

PROPOSED OPERATIONS AND REMARKS.

It is proposed to continue the reconstruction of the outer breakwater under plan "A" with United States plant and hired labor. It is expected to complete the work possible with the funds on hand during the next fiscal year.

In order that this work may be advantageously continued it is recommended that the $100,000 authorized for this work in the river and harbor act of March 2, 1907, be appropriated in the next sundry civil act and $80,000 additional in the next river and harbor act.

Maintenance of the inner breakwater, now becoming much decayed and weak, is estimated at $2,500 for the next fiscal year, and maintenance of the entrance channels and harbor basins for the next fiscal year at $3,000.

The recommendations are summarized as follows:

To be appropriated—Maintenance:	
Reconstruction of outer breakwater under plan "A"	$180,00
Inner breakwater	2,50
Channels and basins	3,00
Total, including contingencies	185,5

Money statement.

July 1, 1907, balance unexpended	$124,011
Received from sales	3,211
	127,22
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	45,11
July 1, 1908, balance unexpended	82,1
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in complian with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	185

APPROPRIATIONS.

.....	$200.00	July 7, 1838
	93,348.64	June 11, 1844

APPROPRIATIONS—continued.

March 3, 1871	$100,000.00	August 10, 1888	$100,000.00
June 10, 1872	100,000.00	September 19, 1890	30,000.00
March 3, 1873	100,000.00	July 13, 1892	40,000.00
June 3, 1874	75,000.00	August 18, 1894	37,000.00
March 3, 1875	90,000.00	June 3, 1896	60,000.00
August 14, 1876	90,000.00	March 3, 1899	60,000.00
June 18, 1878	90,000.00	March 22, 1901 (allotment)	10,000.00
March 3, 1879	90,000.00	June 13, 1902	51,000.00
June 14, 1880	90,000.00	March 3, 1905	100,000.00
March 3, 1881	50,000.00	March 2, 1907	100,000.00
August 2, 1882	80,000.00	Sales	3,283.78
July 5, 1884	80,000.00		
August 6, 1886	71,250.00	Total	2,226,896.65

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending December 31, 1907.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Steam	120	30,271	486	215,321	186	82,958	412	161,248
Sail and barges	112	35,805	419	108,255	66	18,193	447	117,854
Total	232	66,076	905	323,576	252	101,151	859	279,102

Total arrivals and departures (tonnage, 769,905)	2,248
Increase of tonnage, 1907 over 1906	103,947
Amount of revenue collected year ending December 31, 1907	$87,358.42
Value of imports, year ending December 31, 1907	$1,172,864.00
Value of exports, year ending December 31, 1907	$2,246,465.00
Greatest draft of vessels ... feet	14½
Enrolled tonnage, port of Oswego ... gross tons	68,756

Receipts by lake.

[Net tons.]

Articles.	1903.	1904.	1905.	1906.	1907.
Lumber	49,662	67,020	60,174	59,972	53,460
Poles and railroad ties	332	3,352	2,711	1,945	1,607
Posts, pulp wood, etc	37,004	43,756	47,406	55,439	39,769
Shingles	3,510	2,470	2,744	3,045	2,968
Laths	1,189	1,100	1,517	1,588	885
Grain	10,895	17,745	9,063	10,668	11,211
Clay and sand	238	.....	.....	.....	.....
Hay	.....	.....	.....	604	1,007
Miscellaneous	824	671	83	14	234
Total	103,654	136,114	123,698	133,275	111,141

Shipments by lake.

[Net tons.]

Articles.	1903.	1904.	1905.	1906.	1907.
Coal	629,870	576,072	600,702	482,553	616,457
Merchandise	210	315	102	12	492
Total	630,080	576,387	600,804	482,565	616,949

R R 6.

IMPROVEMENT OF HARBOR AT CAPE VINCENT, NEW YORK.

REPORT OF OPERATIONS.

No work, except minor repairs to fenders, cost $21.77, was c
ıring the year, no funds being available for construction.

A watchman was on duty during the year to regulate the moo
f vessels to the breakwater.

PROPOSED OPERATIONS AND REMARKS.

This breakwater is not designed to protect an anchorage, but vessels to moor to and to protect vessels moored at the wharve Cape Vincent. The projected length is 1,500 feet, and 910 feet been completed, of which 50 feet is shore return. It is not consid necessary to extend the shore return, but the remaining 540 fee main breakwater, to complete it to the project length of 1,400 f should be built in timber-crib-concrete form, similar to the 500 of structure built in 1905 and 1906.

It is recommended that the amount (estimated) required for c pletion of existing project, viz, $72,000, be appropriated in the r river and harbor act.

Money statement.

July 1, 1907, balance unexpended	$9
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1
July 1, 1908, balance unexpended	8
Amount (estimated) required for completion of existing project	72,
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	72

APPROPRIATIONS.

June 3, 1896.....
March 3, 1899.....
June 13, 1902.....
March 3, 1905.....

Total.....

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending December

Vessels.	Arrivals from—				Depar	
	Home ports.		Foreign ports.		Home ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tc
Steam	19	2,136	392	39,461	20	
Sail and barges	16	1,560	83	13,275	16	
Total	35	3,696	475	52,736	36	

Total arrivals and departures (tonnage, 115,346)	1,011
Decrease of tonnage, 1907 under 1906	6,183
Amount of revenue collected for year ending December 31, 1907	$25,539.71
Value of imports, year ending December 31, 1907	$242,100.00
Value of exports, year ending December 31, 1907	$198,370.00
Enrolled tonnage, port of Cape Vincent, N. Y. gross tons	8,227
Greatest draft of vessels (at breakwater 16 feet) feet	11

Receipts by lake and river.

[Net tons.]

Articles.	1903.	1904.	1905.	1906.	1907.
Lumber	635	4,553	474	6,078	1,488
Poles, ties, posts, and pulp wood	12,138	12,324	16,242	103,610	18,530
Shingles	275	909	994	526	347
Lath	25	79	.....	112	.....
Fish	699	611	699	569	719
Hay	.....	.....	.....	1,322	392
Miscellaneous	1,894	1,607	3,066	131	289
Total	15,666	20,083	21,475	112,348	21,765

Shipments by lake, miscellaneous merchandise, 181 tons.
Wearing apparel to the value of $9,217 was also shipped.

R R 7.

IMPROVEMENT OF HARBOR AT OGDENSBURG, NEW YORK.

REPORT OF OPERATIONS.

The river and harbor act of March 2, 1907, appropriated $75,000 for work at this harbor, and a project for restoring and improving existing channels with these funds was approved March 26, 1907.

Proposals for the necessary dredging were invited, opened July 2, 1907, and contract made with the Central Dredging Company, Cleveland, Ohio, July 12, for excavating about 310,000 cubic yards of sand and silt from the channels to restore project depths.

Dredging was begun September 5, with one small dredge; a second dredge was placed on the work November 23 and a third dredge November 30. Dredging was suspended for the winter on December 4, 21,762 cubic yards, scow measure, of sand and silt having been dredged from the lower entrance channels. Operations were resumed with one dredge April 13, 1908; a second dredge was placed on the work April 17; a third April 28, and a fourth May 20.

The four dregdes continued operations and at the close of the fiscal year the lower entrance channels and the basin between them had been dredged to the required depth of 16 feet at low water for their full widths; the city front channel below Franklin street was practically completed to its required depth of 15 feet at low water; the city front channel above Franklin street was about one-half completed to its required depth of 14 feet at low water; and some dredging remained to be done on shoal spots in the upper entrance channel to make it of the required depth of 15 feet at low water for its full width.

During the fiscal year 158,937 cubic yards, scow measure, of sand, silt, clay, and some bowlders were removed, at a cost of $26,208.69.

PROPOSED OPERATIONS AND REMARKS.

This harbor fills up with sand and silt and requires frequent dredging to maintain the depth of the project.

The channels to be maintained are:

Upper entrance channel, 3,000 feet long, 200 to 400 feet wide, narrowing to 100 feet at bridge over the Oswegatchie River, depth 15 feet; city front channel above Franklin street, 2,400 feet long, 200 to 500 feet wide, depth 14 feet; city front channel below Franklin street, 2,900 feet long, 200 to 450 feet wide, depth 15 feet; west lower entrance channel, 800 feet long, 350 feet wide, depth 16 feet; east lower entrance channel, 700 feet long, 400 feet wide, depth 16 feet; basin between lower entrance channels, 2,000 feet long, 500 to 600 feet wide, depth 16 feet.

The dredging under the contract now in force will restore all of the channels to the project depths for their full widths. The sum of $13,000 will remain on hand after completing the contract, and this sum is considered sufficient for emergencies during the next fiscal year and pending action on the report of examination and survey made during the fiscal year as provided in the river and harbor act of March 2, 1907, printed in House Document No. 920, Sixtieth Congress, first session.

Money statement.

July 1, 1907, balance unexpended	$75,008.7[illegible]
June 30, 1908, amount expended during fiscal year for maintenance of improvement	19,356.5[illegible]
July 1, 1908, balance unexpended	55,652.[illegible]
July 1, 1908, amount covered by uncompleted contracts	39,273.[illegible]

APPROPRIATIONS AND ALLOTMENTS.

August 30, 1852	$3,000.00	August 2, 1882	$10,[illegible]
March 2, 1867	40,000.00	July 3, 1884	15,[illegible]
July 17, 1870	15,000.00	August 5, 1886	1[illegible]
March 3, 1871	25,000.00	August 11, 1888	[illegible]
June 10, 1872	10,000.00	September 19, 1890	
March 3, 1873	6,000.00	July 13, 1892	
June 23, 1874	6,000.00	August 18, 1894	
March 3, 1875	5,000.00	June 3, 1896	
December 11, 1877 (from appropriation for "Repairs on harbors on northern lakes")	5.56	March 3, 1899	
		June 13, 1902	
		March 13, 1905	
September 10, 1879 (from appropriation for "Examinations, surveys, and contingencies of rivers and harbors")	300.00	March 3, 1905 (allotment)	
		March 2, 1907	
July 26, 1880 (from appropriations for "Examinations, [illegible] and contingencies [illegible]")	50.00	Total	

COMMERCIAL STATISTICS.

Arrivals and departures of vessels for the year ending December 31, 1907.

Vessels.	Arrivals from—				Departures to—			
	Home ports.		Foreign ports.		Home ports.		Foreign ports.	
	Number.	Tons.	Number.	Tons.	Number.	Tons.	Number.	Tons.
Steam	587	344,478	872	90,263	614	367,038	516	55,040
Sail and barges	52	14,276	121	45,866	123	44,507	53	13,787
Total	639	358,754	993	136,129	737	411,545	569	68,827

Total arrivals and departures (tonnage, 975,255)	2,938
Increase of tonnage, 1907 over 1906	59,032
Amount of revenue collected on water transportation, year ending December 31, 1907	$322,691.18
Value of imports by water, year ending December 31, 1907	$35,957,297.00
Value of exports by water, year ending December 31, 1907	$6,416,009.00
Enrolled tonnage, port of Ogdensburg ... gross tons	30,421
Greatest draft of vessels ... feet	16

Receipts by water.

[Net tons.]

Articles.	1906.	1907.	Articles.	1906.	1907.
Coal	193,636	278,628	Shingles	3,765	6,947
Flour	15,967	18,527	Transit merchandise[a]	15,759	5,307
Grain	175,896	152,570	Unclassed merchandise	17,650	.....
Hay	473	.....	Wood pulp	2,791	3,621
Lumber	218,319	248,024	Fish	353	.....
Lath	5,058	3,397	Hides	525	.....
Live stock	263	557	Miscellaneous	21,218	51,455
Nickel and copper	22,143	26,692			
Raw silk	2,423	2,237	Total	696,239	797,962

Shipments by water.

[Net tons.]

Articles.	1906.	1907.	Articles.	1906.	1907.
Coal and coke	176,848	302,026	Transit merchandise[a]	12,401	10,205
Grain	13,399	4,024	Ginseng	18	.....
Machinery	46,256	50,736	Chemicals	818	924
Miscellaneous	95,052	72,621	Merchandise	13,889	.....
Cheese	685	.....			
Alcohol	495	.....	Total	359,861	440,536

[a] Merchandise in transit through Canada from one port of the United States to another port of the United States.

APPENDIX S S.

IMPROVEMENTS OF RIVERS AND HARBORS IN THE LOS ANGELES, CALIFORNIA, DISTRICT.

REPORT OF CAPT. AMOS A. FRIES, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. San Diego Harbor, California.
2. Deep-water harbor at San Pedro Bay, California.
3. Wilmington Harbor, California.
4. San Luis Obispo Harbor, California.

UNITED STATES ENGINEER OFFICE,
Los Angeles, Cal., July 14, 1908.

SIR: I have the honor to forward herewith annual report on works of river and harbor improvement in my charge for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

AMOS A. FRIES,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

S S 1.

IMPROVEMENT OF SAN DIEGO HARBOR, CALIFORNIA.

A contract was entered into July 20, 1907, with the North American Dredging Company, of San Francisco, Cal., for dredging a channel through the outer bar under an appropriation of $20,000 made by river and harbor act of March 2, 1907. This work began September 18, 1907, and was completed October 19, 1907. A total of 37,750 cubic yards of material, at 51 cents per yard, was dredged and dumped at sea. A channel 1,800 feet long and 250 feet wide was dredged to a depth of 28 feet over the east 100 feet and to 27 feet depth over the west 150 feet.

In compliance with river and harbor act of March 2, 1907, reports of examination and survey of the harbor at the entrance thereto were forwarded to the Department May 7, 1907, and October 22, 1907, respectively. These reports were approved and forwarded to Congress, and are printed in House Document No. 961, Sixtieth Congress, first session.

Money statement.

July 1, 1907, balance unexpended	$20,059.13
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	19,752.95
July 1, 1908, balance unexpended	306.18
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	30,000.00

APPROPRIATIONS.

March 3, 1875	$80,000.00	June 13, 1902	$75,000.00
March 3, 1879	1,000.00	March 3, 1903	192,850.00
August 11, 1888	1,000.00	March 3, 1905	10,000.00
September 19, 1890	60,500.00	March 2, 1907	20,000.00
July 13, 1892	50,000.00	Repayment	3.26
August 18, 1894	50,000.00		
June 3, 1896	50,000.00	Total	655,353.26
March 3, 1899	65,000.00		

CONTRACT IN FORCE.

CONTRACT FOR DREDGING AT ENTRANCE TO HARBOR.

Name of contractor: North American Dredging Company.
Contract entered into July 20, 1907; approved August 3, 1907.
Work to begin September 18, 1907; contract completed October 19, 1907.
37,750 cubic yards of material dredged on outer bar, at 51 cents per yard.

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

		Incoming.	Outgoing.
Vessels:			
Steam		435	[illegible]
Sailing		78	[illegible]
Total		513	[illegible]
Tonnage		424,466	[illegible]
Draft, greatest	feet	27.2	[illegible]
Merchandise, general	tons	33,362	[illegible]
Coal	do	52,252	[illegible]
Ores	do	586	[illegible]
Cement	do	10,284	
Crude oil	barrels	77,000	.....
Live stock	tons	4,740	[illegible]
Onyx	do	640	.....
Coke	do	2,822	.....
Fertilizer	do	1,441	.....
Hay	do	.....	
Pig iron	do	2,409	.....
Lumber	feet	68,121,000	

Total amount of freight entered and cleared in 1907, 283,559 tons, an increa per cent over the preceding year.

The American-Hawaiian Steamship Company established a line of transp during the year.

S S 2.

DEEP-WATER HARBOR AT SAN PEDRO BAY, CALIFORNIA.

The construction of the breakwater was continued during the year, under continuing contract dated June 7, 1900, with the California Construction Company, of San Francisco, Cal.

At the beginning of the fiscal year 1,968,319 tons of stone had been deposited in the substructure, which had been raised to mean lower low water and was about completed for the length of 8,452 feet from its westerly end, and 169,394 tons had been placed in the superstructure. The amount of superstructure work done was the equivalent of 6,606 feet of completed wall.

During the fiscal year ending June 30, 1908, 68,437 tons of granite was placed in the substructure, and 38,372 tons of granite in the superstructure, and 11,469 tons of granite was placed as a berm at the toe of the ocean slope of the superstructure. The substructure was extended 155 feet, making a total length of 8,607 feet. The superstructure was extended 1,464 feet, making the total length about 8,070 feet.

In compliance with provisions of the river and harbor act of March 2, 1907, a report and estimate of cost of extending the breakwater to the shore was submitted to the Department on June 20, 1907. This report and estimate has been approved and forwarded to Congress, and is printed in House Document No. 969, Sixtieth Congress, first session.

Bulkheading and filling certain areas in the outer harbor has been in progress during the year by the Outer Harbor Dock and Wharf Company (successors to Randolph H. Miner), the Pacific Wharf and Storage Company (successors to John T. Gaffey and others), and the San Pedro, Los Angeles and Salt Lake Railroad Company.

Money statement.

July 1, 1907, balance unexpended	$505,788.87
June 30, 1908, amount expended during fiscal year for works of improvement	219,916.97
July 1, 1908, balance unexpended	285,871.90
July 1, 1908, outstanding liabilities	27,954.19
July 1, 1908, balance available	257,917.71
July 1, 1908, amount covered by uncompleted contracts	295,283.15
Amount (estimated) required for completion of existing project	100,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	100,000.00

APPROPRIATIONS.

June 3, 1896	[a] $50,000.00	June 30, 1906	$200,000.00
July 1, 1898	400,000.00	March 4, 1907	92,915.00
March 3, 1899	200,000.00		
March 3, 1901	146,000.00	Total	2,800,000.00
June 28, 1902	311,085.00	Receipts from sales	.05
March 3, 1903	500,000.00		
April 28, 1904	350,000.00	Total	2,800,000.05
March 3, 1905	460,000.00		

CONTRACT IN FORCE.

CONTRACT FOR CONSTRUCTION OF BREAKWATER.

Name of contractor: California Construction Company.
Contract entered into June 7, 1900; approved June 27, 1900.
Work to begin August 4, 1900; contract to be completed March 31, 1907.
Contract extended for reasonable period.

Rates:		
For substructure stone, per ton of 2,240 pounds		$0.844
For superstructure stone, per ton of 2,240 pounds		$3.10
For concrete, per cubic yard		$6.00
Quantities (estimated):		
Stone in substructure	tons	2,210,958
Stone in superstructure	do	242,400
Total	do	2,453,358
Concrete	cubic yards	2,370

Total consideration of contract (approximate), $2,648,046.05.

COMMERCIAL STATISTICS FOR YEAR ENDING DECEMBER 31, 1907.

For commercial statistics, see report of Wilmington Harbor, California.

S S 3.

IMPROVEMENT OF WILMINGTON HARBOR, CALIFORNIA.

Dredging with Government dredge.—The dredge *San Pedro* was employed during the year in dredging along the upper wharves and in the lower and easterly parts of the turning basin. All dredging over completed areas was carried to a depth of 25.5 feet below mean lower low water, and with few exceptions this depth was maintained. A total of 843,785 cubic yards of material was dredged from 5,678 linear feet of cut, averaging 200 feet in width and varying from 5.5

[a] Of the appropriation of $50,000 made by river and harbor act of June 3, 1896, for deep-water harbor at Santa Monica Bay, or San Pedro Bay, California, $35,555.76 was expended by the Board provided for by said act. For the full report of the Board, with its accompanying documents, see Senate Document No. 18, Fifty-fifth Congress, first session.

to 27.9 feet (average 17.1 feet deep). This material was wasted as follows:

	Cubic yards.
Pumped 1,534 to 2,391 feet and delivered to relay plant of Pacific Wharf and Storage Company	569,835
Pumped 1,737 to 3,049 feet and wasted upon concession of Salt Lake Railroad Company, east of Terminal Island	126,227
Pumped 1,895 to 2,361 feet and wasted in Ocean east of Salt Lake Railroad Company's stone jetty	114,253
Pumped 1,106 feet and wasted upon lands of Southern California Lumber Company on west side of Terminal Island	1,970
Pumped 1,356 to 1,790 feet and wasted upon lands of National Lumber Company on west side of Terminal Island	31,500
Total	843,785

The material removed consisted of quicksand, shell, clay, and hardpan in varying proportions in different localities, the middle ground being made up almost entirely of quicksand and shell. Beds of clay were encountered opposite the sloughs from the west basin and an underlying stratum of hardpan 5 to 6 feet thick was encountered over a width of about 300 feet along the easterly side of the turning basin northward of the southerly end of the National Lumber Company's wharf.

The following statement shows the distribution of time for the dredge during the year:

	Hours.	Minutes.
Moving and placing plant	328	25
Actual pumping	5,320	30
Repairs and alterations	838	35
Time lost passing vessels	129	00
Cleaning suction	65	20
Advancing	540	10
Not working (52 Sundays and 13 holidays)	1,560	00
Total	8,782	00

The following statement shows the cost of dredging during the year:

Routine office work, labor and maintenance	$2,250.00
Care of plant, labor	900.00
Surveys, labor	210.00
Towage and dispatch work, labor and supplies	1,118.08
Alterations and repairs to dredge and attendant plant, labor and supplies	10,354.96
Operating dredge, superintendence, labor charges, fuel, fresh water, lubricants, and other supplies	42,856.46
Deterioration of plant and property during fiscal year	13,603.24
Total cost of dredging	71,292.74
Amount of material removed ... cubic yards	843,785
Cost per cubic yard	$0.0845

Considering the actual pumping time for the entire year the average percentage of solids to the total flow through the discharge pipe was nearly 4.4 per cent. Heretofore the average per cent of solids has been 5 per cent, the loss of 0.6 per cent being due to the greater average length of discharge, and somewhat to the lack of clayey substance in the sand and broken shell, both of which were remarkably clean during much of the year. Great care had to be

exercised when dredging the beds of sand and shell to keep the pipe line from clogging.

Relay Pumping Plant.—The Relay Pumping Plant, owned by the Pacific Wharf and Storage Company, and located on Terminal Island, consists of one 48-inch runner Eclipse sand and gravel pump, with 18-inch suction and 20-inch discharge, driven by two three-phase induction motors, as follows: One 100-horsepower type "A" 2,000-volt Bullock motor; one 150-horsepower type "C" 2,000-volt Westinghouse motor. Both motors were driven on the same shaft, but on separate pulleys.

This plant was placed in operation August 1, 1907, and, except for short stops from time to time for necessary repairs, was continuously employed until April 25, 1908, when it was shut down and the plant moved to a new location about 1,500 feet northward of the old location and where a third motor was also installed. The operation of this plant has not been resumed.

The 569,835 cubic yards of material delivered by the *San Pedro* to this plant was relayed by it 1,534 to 2,391 feet and wasted principally upon the concession of the Salt Lake Railroad Company behind their stone bulkhead. A small percentage, however, reached the concession of the Pacific Wharf and Storage Company.

Miscellaneous work.—During the year 838 hours were spent in making repairs to the dredge incident to the work. The principal items were as follows: Boilers cleaned in July and January; defective boiler tubes and nipples were replaced; main engine was overhauled; a new wrist pin was put in the main engine shaft and the bearings were turned up; the main pump was relined and all auxiliary machinery was thoroughly overhauled; the worn-out cutter gearing was replaced, as also the worn-out suction and discharge pipe; the hull and ladder of dredge were cleaned and repainted. All repairs, except a small amount of boiler work and the work on main engine shaft, were performed by the dredge crew, the machine work being done in the machine shop aboard the dredge. The cost, including labor, was $9,257.50.

The launch *Pedrito* was hauled out on the inclined ways three times during the year for cleaning, painting, and repairs, at a cost of $74.86.

Forty-two pontons and lighters were pulled out on the inclined ways during the year. Worm-eaten spots were cut out; new fenders put on where required; leaky seams calked, and the bottom of the hulls cleaned and copper painted. The cost of this work was $964.21.

Nine skiffs were repaired, cleaned, and painted, at a cost of $58.39.

Fifty-eight small tools, consisting of special wrenches, chisels, drills, sledges, blacksmith and outfitting tools for outfitting dredge, and four parts of special machinery were made, at a cost, including labor, of $173.69.

New shores were set up under the outer end of the inclined ways, replacing those that were worm-eaten, at a cost of $48.38.

The boat landing at the Government warehouse was shored up, at a cost of $37.30.

In compliance with river and harbor act of March 2, 1907, reports of examinations and surveys with a view to obtaining an increased depth were forwarded to the Department April 24, 1907, and December 17, 1907, respectively.

Money statement.

July 1, 1907, balance unexpended	$185,967.88
June 30, 1908, amount expended during fiscal year for works of improvement	68,935.96
July 1, 1908, balance unexpended	117,031.92
July 1, 1908, outstanding liabilities	1,640.38
July 1, 1908, balance available	115,391.54
July 1, 1908, amount covered by uncompleted contracts	18,000.00

APPROPRIATIONS.

March 3, 1871	$200,000.00	July 13, 1892	$51,000.00
June 10, 1872	75,000.00	June 3, 1896	50,000.00
March 3, 1873	150,000.00	June 13, 1902	250,000.00
March 3, 1875	30,000.00	March 3, 1905	100,000.00
June 18, 1878	20,000.00	June 30, 1906	100,000.00
March 3, 1879	12,000.00	March 2, 1907	113,000.00
June 14, 1880	35,000.00	March 4, 1907	50,000.00
March 3, 1881	33,000.00		
August 2, 1882	100,000.00	Total	1,618,000.00
July 5, 1884	50,000.00	Receipts from sales and for injuries to dredge	97.25
August 5, 1886	75,000.00		
August 11, 1888	90,000.00		
September 19, 1890	34,000.00	Aggregate	1,618,097.25

CONTRACT IN FORCE.

CONTRACT FOR FURNISHING CRUDE OIL.

Name of contractor: H. S. Botsford.
Contract entered into June 25, 1907; approved July 9, 1907.
Deliveries to begin July 1, 1907.
Contract completed June 30, 1908.
Twenty thousand barrels of oil for fuel for dredge delivered, at 85 cents per barrel.

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

[Furnished by the collector of customs at Los Angeles, Cal.]

	Foreign commerce.		Domestic commerce.	
	Incoming.	Outgoing.	Incoming.	Outgoing.
Vessels:				
Steam	4	4	1,286	1,284
Sailing	1	1	359	351
Total	5	5	1,645	1,635
Tonnage	10,997	10,997	789,068	782,019
Draft, greatest ... feet	23.6	23.6	23.6	23.6
Merchandise, general ... tons	409		56,975	20,315
Coal ... do			158	30
Cement ... barrels	50,596			9,980
Crude oil ... do			491,296	28,332
Lumber ... feet			546,866,000	
Oak logs ... do	1,638,325			

Foreign commerce, 13,805 tons; domestic commerce, 1,259,795 tons; total, 1,273,600 tons, an increase of 26 per cent over the preceding year.

The North Pacific Steamship Company and the Pacific Coast Steamship Company established new lines of transportation during the year.

S S 4.

IMPROVEMENT OF SAN LUIS OBISPO HARBOR, CALIFORNIA.

The river and harbor act of March 2, 1907, appropriated $63,660 for continuing the construction of the breakwater, and provided that the Secretary of War may enter into a contract or contracts for the completion of the breakwater not to exceed, in the aggregate, $200,000, exclusive of the amounts appropriated. Under this authority a contract was entered into July 16, 1907, with the San Francisco Bridge Company, of San Francisco, Cal., for the delivery in the breakwater of 151,140 tons of stone at $1.57 per ton, making the total consideration of the contract $237,294. On account of the severe storms in this locality during the winter months the contract provided that the contractor need not work unless he so desired from November 1 to April 30 of each year. The contractor, exercising this option, decided to begin work May 1, 1908. However, on account of the shoaling of the channels around Morro Rock quarry, where stone for the breakwater is obtained, and also on account of the unusually heavy swell during the spring, the contractor was unable to deliver any stone in the breakwater up to the close of the fiscal year, although he has secured an efficient plant and is ready to begin work when conditions will permit.

Money statement.

July 1, 1907, balance unexpended	$63,659.17
Amount appropriated by sundry civil act approved May 27, 1908	60,000.00
	123,659.17
June 30, 1908, amount expended during fiscal year for works of improvement	833.07
July 1, 1908, balance unexpended	122,826.10
July 1, 1908, outstanding liabilities	79.55
July 1, 1908, balance available	122,746.55
July 1, 1908, amount covered by uncompleted contracts	237,294.00
Amount (estimated) required for completion of existing project	140,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	100,000.00

APPROPRIATIONS.

August 11, 1888	$25,000.00	March 2, 1907	$63,660.00
September 19, 1890	40,000.00	May 27, 1908	60,000.00
July 13, 1892	30,000.00		
August 18, 1894	40,000.00	Total	428,660.00
June 3, 1896	40,000.00	Receipts from sales	.95
March 3, 1899	55,000.00		
June 13, 1902	50,000.00	Aggregate	428,660.95
March 3, 1905	25,000.00		

CONTRACTS IN FORCE.

CONTRACT FOR COMPLETING BREAKWATER.

Name of contractor: San Francisco Bridge Company.
Contract entered into July 16, 1907; approved August 15, 1907.
Work to begin May 1, 1908.
Contract to be completed: Indefinite, depending upon appropriations by Congress.
Contract for delivering in breakwater 151,140 tons of stone, at $1.57 per ton.

COMMERCIAL STATISTICS FOR THE YEAR ENDING DECEMBER 31, 1907.

[Furnished by Pacific Coast Railway Company.]

	Incoming.	Outgoing.
Vessels:		
Steam and gasoline	404	404
Sailing	21	21
Barges	85	85
Total	510	510
Tonnage	370,400	370,400
Draft, greatest ... feet	26	26
Merchandise, general ... tons	15,955	1,249
Grain ... do	.....	11,109
Bituminous rock ... do	.....	1,501
Lumber ... feet	15,101,305	.....
Crude oil ... barrels	.....	6,216,163

Total amount of freight entered and cleared in 1907, 1,096,054 tons, an increase of 89 per cent over the preceding year.

An 8-inch pipe line for carrying crude oil from the Santa Maria oil fields to Oilport was built during the year.

APPENDIX T T.

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST SAN FRANCISCO, CALIFORNIA, DISTRICT.

REPORT OF LIEUT. COL. JOHN BIDDLE, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Oakland Harbor, California.
2. San Pablo Bay, California.
3. San Joaquin River, California.
4. Stockton and Mormon channels, California.
5. Mokelumne River, California.
6. Petaluma Creek and Napa River, California.
7. Humboldt Harbor and Bay, California.
8. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,
San Francisco, Cal., July 10, 1908.

SIR: I have the honor to transmit herewith the annual report of river and harbor works under my charge for the fiscal year ending June 30, 1908.

Very respectfully,

JOHN BIDDLE,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

T T 1.

IMPROVEMENT OF OAKLAND HARBOR, CALIFORNIA.

During the year work under the contract with Marshall C. Harris made satisfactory progress until March 27, 1908, when the contractor's dredge engaged on this work was destroyed by fire. This accident retarded the completion of the work by about four months. The work will be completed about September 1, 1908. The price paid was 10.5 cents per cubic yard, place measurement, and the quantity of material removed under this contract during the fiscal year was 426,584 cubic yards. The total contract is about 2.000,000 cubic yards.

On May 4, 1908, a contract was entered into with the San Francisco Bridge Company to dredge, at 18.8 cents per cubic yard, a channel 300 feet wide and 25 feet deep from Fallon street easterly to the tidal basin, and a channel 300 feet wide and 17 feet deep around the north

side of the tidal basin to the tidal canal, and from the tidal canal along the Alameda shore to Tenth avenue. This will require the removal of about 1,916,700 cubic yards of material. Up to June 30, 232,264 cubic yards of material were dredged and deposited under this contract. This contract expires December 6, 1910.

Specifications have been printed and bids will be called for for widening the channel from San Francisco Bay to Fallon street from 300 feet to 500 feet, the depth to remain at 25 feet, as at present.

In explanation of the increase of $500,000 in carrying out the project for improving Oakland Harbor the following history of this improvement is given:

In the Annual Report of the Chief of Engineers for 1901 three projects were made of Oakland Harbor and so submitted. In the act of June 30, 1902, funds were appropriated for improving the harbor without specifying which of the three plans would be adopted. These funds were used on work common to all three projects. In the act of March 3, 1905, project No. 3, for which an estimate of $968,203 had been made, was specifically adopted and further funds appropriated and authorized, the work, however, being restricted to certain portions of the project. In obedience to resolution of the River and Harbor Committee of Congress, the Board of Engineers for Rivers and Harbors, under date of June 11, 1907, gave a full history of the work up to that date and recommended completion of project No. 3, and providing for additional funds estimated to complete that project. The work done up to that date had been done at a much lower figure than had been estimated for. This was due to the contractor being able to sell the material dredged, which probably can not be done so advantageously in future operations. There were, therefore, to be under the amount estimated, some funds remaining, and the Board recommended that these funds should be used for such further extension of the improvement as might be found necessary. The act of March 2, 1907, provided for the amount remaining to make up the estimate of $968,203—that is, $368,203—and further stated that any amounts heretofore appropriated and authorized should be used in addition. The previous authorizations were $146,000, so that the total amount for completion of the project then in force would be about $514,203. This same act, however, specified that the projected improvement be extended as recommended by the Board of Review on Rivers and Harbors in their report of July 11, 1907, and stated definitely what these extensions should be. This final project as laid down by the act of Congress was much more extensive than the original project called for. Both projects appear in the summary of the Chief of Engineers for Oakland Harbor for this year. The additional amount of dredging necessary would be about 2,000,000 yards. The amount, therefore, appropriated and authorized is not sufficient to complete this work as directed. In the Annual Report of 1907 and of 1908 an additional amount of $500,000 is estimated for.

In order to determine definitely how much of the project could be done (exclusive of the extension of the jetty) within the amount authorized, $514,203, proposals were asked for the whole work, dividing it into five sections, A, B, C, D, and E. The total of lowest bids received was greater than the amount authorized by about $200,000. A contract was entered into with the lowest bidder for sections C, D,

and E, which is the upper part of the harbor opposite and above the docks, it being more important to first dredge this out to a greater width and depth than to widen the entrance.

The lowest bidder on sections A and B was asked, by direction of the Chief of Engineers, if he would be willing to do a portion of the work—that is to say, about one-third—for which there was money available at the price bid. He declined to do it. The next lowest bidder, who was about 1 cent per cubic yard higher, expressed his willingness to do it, but by direction of the Chief of Engineers the bids for sections A and B were rejected and proposals again asked for for such portion of this work as there was money available and authorized. The Chief of Engineers, under date of September 1, 1908, directed the rejection of all bids received under these last proposals.

For the completion of the project there remains to be dredged beyond that contracted for 1,768,100 cubic yards. The lowest bid received for this with the last proposals was 18 cents per cubic yard, making the cost $318,258. The estimated cost of the extension of the jetty is $50,000. Adding 20 per cent for office and engineering expenses makes a total of about $442,000.

It will be necessary to allow for overdepths, paid for usually at half price. It will also be necessary to provide for the filling in which takes place during dredging, for probable shoaling at the mouth of the channel, for general maintenance of the channel, repair of a portion of the tidal canal embankment, and for a possible extension of the jetties. It is difficult to estimate the cost at this stage, but it will reach about $75,000. The total cost will therefore be about $517,000.

There is available or authorized, outside of the amount contracted for, about $135,000. It is therefore probable that the project can be satisfactorily completed with an increased appropriation of $400,000 instead of $500,000. It is not considered advisable, however, to reduce the estimate of the amount required to complete until the work has further progressed and more accurate knowledge obtained.

In accordance with the original project (see Annual Report of the Chief of Engineers for 1874, page 378), a tidal canal for flushing purposes has been constructed, connecting San Leandro Bay with the Oakland channel. This is an artificial channel. San Leandro Bay is a shallow stretch of water about 1 mile square in extent, and also connected with South San Francisco Bay by an opening 5 miles south of Oakland channel. It has acted as a tidal basin for Oakland channel and has been of material assistance in keeping depths. There is a small amount of commerce on this bay, and it is used for pleasure craft. The direct connection with South San Francisco Bay is gradually shoaling. The original project provided for closing this opening, but it was not done and does not seem necessary.

The tidal canal is about 1½ miles long, 8 feet deep at low water, and a little less than 400 feet wide at top of banks. The right of way belonging to the United States is 400 feet wide, so that the United States controls the banks. Over this canal were built three bridges by the United States on the line of existing streets, viz, High street, Fruitvale avenue, and Park street. Fruitvale Avenue Bridge is a combined wagon and railroad bridge. These bridges were all constructed as draws. These are not opened for the passage of vessels, as the tidal canal has not been considered a stream open to public

navigation, though small craft go under the bridges. There are no watchmen or bridge tenders. They have been kept in repair out of the appropriation for improvement of Oakland Harbor.

As the commerce of Oakland Harbor increased and factories were established a demand for additional water front arose. To meet the demand the front on the tidal canal below Park Street Bridge (on the Oakland side of all the bridges) has been in large part leased to abutting property owners.

A further demand has now arisen for the water front along the whole length of the canal and for the operation of the draws in order to provide for navigation in the canal and connection with San Leandro Bay. The leasing of this front has always been disapproved, as it would involve the United States into the expense of operating the drawbridges. While it was proper for the United States to build and keep in repair these bridges which took the place of the streets, now that it is desired to consider the canal as a navigable stream with valuable frontage, these bridges should be treated as other bridges over navigable waters and operated and cared for by the local authorities.

The use of this canal and its frontage for commercial purposes is considered desirable, and temporary permits for floats have been given the city of Alameda and private persons, but no permanent structures allowed or leases made.

It is recommended therefore that the bridges be turned over to the local authorities, and that thereafter all costs of repair, operation, and replacement when necessary be assumed by these authorities.

The bridges have recently been repaired and painted and are in good condition. To place them in condition to be operated would cost $3,500 for the Park Street Bridge to be operated by electricity, and about $1,000 each for the other bridges to be worked by hand power. The Park Street Bridge is heavy and needs power other than hand; the two others do not.

Money statement.

July 1, 1907, balance unexpended		$158,050.38
Amount appropriated by sundry civil act approved May 27, 1908		190,000.00
		348,050.38
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$59,633.72	
For maintenance of improvement	3,962.29	
		63,596.01
July 1, 1908, balance unexpended		284,454.37
July 1, 1908, outstanding liabilities		34,427.60
July 1, 1908, balance available		250,026.77
July 1, 1908, amount covered by uncompleted contracts		358,796.19
Amount (estimated) required for completion of existing project		756,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement—		
As authorized under continued contracts	$256,000.00	
To continue work on authorized project	250,000.00	
For maintenance of improvement	15,000.00	
		521,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

June 24, 1874	$100,000	June 4, 1897	$200,000
March 3, 1875	100,000	July 1, 1898	133,000
August 14, 1876	75,000	March 3, 1899	133,000
June 18, 1878	80,000	June 6, 1900	180,000
March 3, 1879	60,000	June 13, 1902	100,000
June 14, 1880	60,000	March 3, 1903	131,000
March 3, 1881	60,000	April 28, 1904	19,000
August 2, 1882	200,000	March 3, 1905	100,000
July 5, 1884	139,600	June 30, 1906	81,000
August 5, 1886	60,000	March 2, 1907	68,203
August 11, 1888	350,000	March 4, 1907	23,000
September 19, 1890	250,000	May 27, 1908	190,000
July 13, 1892	150,000		
August 18, 1894	100,000	Total	3,162,803
June 3, 1896	20,000		

CONTRACTS IN FORCE.

Contract dated October 9, 1905, for dredging about 1,655,000 cubic yards of material from Oakland Harbor, California. Rate: 10.5 cents per cubic yard.

Name of contractor: Marshall C. Harris.

Date of commencement: October 24, 1905.

Date of completion: Work still in progress; will probably be completed about September 1, 1908.

The date of approval of this contract is unknown, owing to the loss of all records of the office by fire.

Contract dated May 4, 1908, for dredging about 1,916,700 cubic yards of material from Oakland Harbor, California. Rate: 18.8 cents per cubic yard.

Name of contractor: San Francisco Bridge Company.

Date of commencement: May 23, 1908.

Date of completion: Work still in progress; will probably be completed about February, 1910.

Date of approval: May 29, 1908.

COMMERCIAL STATISTICS.

The following statements show the traffic by vessels and by ferryboats which passed through the channel way between the jetties during the calendar year 1907:

The classified freight carried by merchant vessels during the year comprised:

	Tons.
Coal, wood, coke, and oil	219,068
Hay, grain, flour, etc	103,400
Lumber	587,272
Building material	353,411
Miscellaneous	84,296
Total by vessels, calendar year 1907	1,347,447
Total by ferries, calendar year 1907	2,862,678
Grand total	4,210,125

T T 2.

IMPROVEMENT OF SAN PABLO BAY, CALIFORNIA.

No work was done on this project during the last fiscal year. The small amount expended was for the payment of office and other minor expenses incident to work completed in the previous fiscal year.

Money statement.

July 1, 1907, balance unexpended	$21,670.16
June 30, 1908, amount expended during fiscal year, for works of improvement	590.69
July 1, 1908, balance unexpended	21,079.47

APPROPRIATIONS.

June 13, 1902	$100,000.00
March 3, 1903	200,000.00
June 30, 1906	53,168.41
Total	353,168.41

COMMERCIAL STATISTICS.

The commerce passing through San Pablo Bay includes all that coming through San Francisco from the Sacramento, San Joaquin, and Napa rivers and Petaluma Creek, which, being all carried on stern-wheel flat-bottom river steamers and barges, is not particularly benefited by the deep channel over the shoal. However, all the commerce of Karquines Straits and Port Costa, which is mostly carried on deep-sea ships, and all vessels going to and from Mare Island Navy-yard are benefited by the dredged channel.

T T 3.

IMPROVEMENT OF SAN JOAQUIN RIVER, CALIFORNIA.

The emergency contract entered into with the San Francisco Bridge Company in December, 1906, to do the dredging required to remove the shoal in Stockton Channel, was completed in September, 1907. The price paid was 6.48 cents per cubic yard. There were 312,404 cubic yards of material removed under the contract, amounting to $20,243.78.

Although there was no freshet in the spring of 1908, yet in March Stockton Channel had filled up again to such an extent that immediate redredging was necessary to accommodate the regular traffic using this stream. Accordingly an emergency contract was entered into with Marshall C. Harris on March 20, 1908, to dredge Stockton Channel to a depth of 9 feet to Yosemite street, and to so much dredging in Mormon Channel as funds on hand would permit. The price paid was 10½ cents per cubic yard. The total amount of material dredged

was 176,207 cubic yards, amounting to $18,501.74, which practically exhausted the funds on hand, as the small remainder was necessary to pay the proportionate office and engineering expenses incident to the work. No dredging was, therefore, done in Mormon Channel, but the contractor, under a private contract to fill a certain area adjacent to Stockton Channel, dredged that channel east of Yosemite street to a depth of 16 feet and for a length of about 600 feet. This work, of course, cost the Government nothing.

On June 30, 1908, there was an available depth of 9 feet in the Stockton Channel, which is sufficient for present navigation. However, until the diverting canal is completed and the waters of Mormon Channel and the Calaveras River turned into it, there will continue to be a rapid refilling of Stockton Channel, as in every previous year, if the temporary dam constructed by the city of Stockton be removed.

The amount now remaining on hand will be used in case it is necessary to remove any small shoal that may form during the coming year in the San Joaquin River adjacent to this locality.

Money statement.

July 1, 1907, balance unexpended	$33,617.17
June 30, 1908, amount expended during fiscal year for maintenance of improvement	31,884.11
July 1, 1908, balance unexpended	1,733.06
Amount (estimated) required for completion of existing project	Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	30,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 14, 1876	$20,000	June 3, 1896	$57,750
June 14, 1880	20,000	March 3, 1899	20,000
March 3, 1881	40,000	June 13, 1902	18,000
August 2, 1882	40,000	Allotted from act of April 28, 1904	35,170
July 5, 1884	20,000	March 3, 1905	20,000
August 5, 1886	18,750	March 2, 1907	30,000
August 11, 1888	25,000		
September 19, 1890	75,000		
July 13, 1892	65,000	Total	554,670
August 18, 1894	50,000		

COMMERCIAL STATISTICS.

The commerce of the San Joaquin River is large and important. Two companies run boats and barges regularly between San Francisco and Stockton, the head of navigation on the lower river, and a large number of schooners ply on the lower river, carrying the heavier freight.

The following is a statement of the commerce carried by the vessels of the steamboat lines, but it has been found impracticable to obtain an authentic

statement of the freight carried by the schooners and launches which ply on the river, as they run irregularly and no account is kept of their business:

Exports.

	Tons.	Value.
Flour and mill stuffs	147,[illegible]	[illegible],[illegible],351
Grain	157,[illegible]	3,841,568
Merchandise	343	20,580
Fruit and vegetables	282,000	8,490,000
Hay	10,000	500,000
Total	618,472	18,2[illegible],[illegible]

Imports.

	Tons.	Value.
Merchandise	118,000	[illegible],[illegible],000
Lumber	.....	1,115,000
Tan bark	.....	35,210
Total	118,000	7,[illegible],[illegible]

T T 4.

IMPROVEMENT OF STOCKTON AND MORMON CHANNELS, CALIFORNIA.

A description of what is proposed for this improvement is printed in the Annual Report of the Chief of Engineers for 1906, page 2430. The title for the right of way for the canal has been acquired by the State of California and transferred to the United States, and the transfer has been approved by the United States Attorney-General. Proposals for building this canal and the necessary railroad and highway bridges are now being called for by advertisements. Bids will be opened July 8, 1908, and if successful in awarding the contract, work will be pushed forward and the whole project completed about December 1, 1909.

When completed this canal will carry the waters of the Calaveras River and its attendant débris around north and east of Stockton, and thus save Stockton Channel from being continually filled and necessitating such frequent and expensive dredging.

Money statement.

July 1, 1907, balance unexpended	$224,316.00
June 30, 1908, amount expended during fiscal year for works of improvement	1,955.69
July 1, 1908, balance unexpended	222,360.31
Amount (estimated) required for completion of existing project	56,079.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement (continuing contract authorized March 2, 1907), in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	56,079.00

APPROPRIATIONS.

June 13, 1902	$50,000	March 3, 1905	$49,316
March 3, 1903	30,000		
April 28, 1904	25,000	Total	224,316

T T 5.

IMPROVEMENT OF MOKELUMNE RIVER, CALIFORNIA.

The only work done during the last fiscal year was that of removing snags and overhanging limbs obstructing navigation, making two short cut-offs, and removing three sand bars, aggregating 675 feet in length, at a cost of $1,071.36.

Money statement.

July 1, 1907, balance unexpended	$3,697.12
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,071.36
July 1, 1908, balance unexpended	2,625.76
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	2,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

July 5, 1884	$8,500	March 3, 1905	$2,500
August 5, 1886	2,500	March 2, 1907	2,500
August 11, 1888	2,000		
July 13, 1892	2,500	Total	23,000
August 18, 1894	2,500		

COMMERCIAL STATISTICS.

No record has been kept of the tonnage on this river. It is estimated by various parties as between 50,000 and 100,000 tons for the year 1907. This is largely carried by scow schooners on irregular trips. The steamboat company operating on the river gives the amount of tonnage carried by its steamers in 1907 as 14,640 tons, at an estimated value of $1,000,000. The imports are lumber, coal, live stock, and merchandise; the exports, grain, fruit, vegetables, and other produce.

T T 6.

IMPROVEMENT OF PETALUMA CREEK AND NAPA RIVER, CALIFORNIA.

(A) PETALUMA CREEK.

Under the provisions of the act of March 2, 1907, for the improvement of this stream, a contract was entered into with the Bay and River Dredging Company on November 29, 1907, to do the required dredging in this creek. The work was divided into two parts, sections Nos. 1 and 2. Section No. 1 is all redredging and section No. 2 has some hardpan to be removed. The price paid is 8.4 cents per cubic yard for section No. 1 and 14.8 cents per cubic yard for section No. 2. About 40,000 cubic yards have been dredged to June 30, 1908, on this contract. When this work is completed there will be sufficient channel for all present needs of navigation. The creek is continually shoaling and will need constant appropriations for dredging. Moreover, in the future dredging in San Pablo Bay to reach the creek will doubtless be necessary.

Money statement.

July 1, 1907, balance unexpended	$17,430.48
June 30, 1908, amount expended during fiscal year for works of improvement	3,634.14
July 1, 1908, balance unexpended	13,796.34
July 1, 1908, outstanding liabilities	691.81
July 1, 1908, balance available	13,104.53
July 1, 1908, amount covered by uncompleted contracts	11,500.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	15,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

July 14, 1880	$8,000	March 3, 1899	$4,000
March 3, 1881	8,000	June 13, 1902	3,000
August 2, 1882	14,000	March 3, 1905	2,000
August 11, 1888	2,000	March 2, 1907	15,239
September 19, 1890	4,000		
July 13, 1892	10,000	Total	85,239
August 18, 1894	15,000		

CONTRACTS IN FORCE.

Contract dated November 29, 1907, for dredging 146,000 cubic yards of material from Petaluma Creek, California.

Rate: Section No. 1, 8.4 cents per cubic yard; section No. 2, 14.8 cents per cubic yard.

Name of contractor: Bay and River Dredging Company.

Date of commencement: April 15, 1908.

Date of completion: Work still in progress; will probably be completed about October, 1908.

Date of approval: March 27, 1908.

COMMERCIAL STATISTICS.

The commerce of Petaluma Creek for 1907 was carried by two steamers—the *Gold*, of 334 tons, and the *Sonoma*, of 305 tons, which made daily trips between San Francisco and Petaluma—and by 38 scow schooners, which plied on the creek at various times.

The following statistics, collected under the direction of the Chamber of Commerce of Petaluma, show the quantity of freight carried:

	Imports.		Exports.	
	Tons.	Value.	Tons.	Value.
By schooner	76,893	$1,798,840	13,050	$123,750
By steamer	30,199	1,103,795	29,801	1,930,998
Total	107,092	2,902,635	42,851	2,054,748

Total freight, 149,943 tons.

(B) NAPA RIVER.

Funds for the improvement of this river were appropriated by the act of March 2, 1907. A survey was made in June, 1907, to determine the extent of shoaling and to ascertain the quantity of material necessary to be removed to obtain the depths and widths required by the approved project. It was found necessary to enter into an emergency contract to do this work. Accordingly, a contract was entered into with R. A. Perry, on July 31, 1907, to remove the shoals in this river at 17¾ cents per cubic yard. This work was completed December 3, 1907. Under this contract 20,362 cubic yards of material were removed, at a cost of $3,563.35. There is now a channel 75 feet wide and 4 feet deep at low water up to the head of navigation. This is considered ample for all present needs of navigation.

Money statement.

July 1, 1907, balance unexpended	$9,178.75
June 30, 1908, amount expended during fiscal year for works of improvement	4,303.48
July 1, 1908, balance unexpended	4,875.27
July 1, 1908, outstanding liabilities	75.00
July 1, 1908, balance available	4,800.27
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

August 12, 1888	$7,500.00	April 28, 1904 (allotted)	$4,429.36
September 19, 1890	10,000.00	March 3, 1905	1,000.00
August 18, 1894	4,000.00	March 2, 1907	8,000.00
June 3, 1896	4,000.00		
June 13, 1902	3,000.00	Total	41,929.36

COMMERCIAL STATISTICS.

During 1907 the commerce of Napa River was carried on three steamboats, the *St. Helena*, 344 tons; the *Zinfandel*, 320 tons; and the *Napa City*, 178 tons, which maintain a regular daily service between San Francisco and Napa; and by many scow schooners, which make trips to the city of Napa at irregular periods.

The following statement of the quantity of freight carried during the year 1907 was collected and furnished by the Napa Chamber of Commerce:

	Tons.
General merchandise	46,090
Lumber	18,510
Wine	17,100
Hay	8,770
Fuel oil	8,616
Cement, brick, lime, sand	6,346
Grain and mill stuff	6,240
Liquor and beer	980
Coal	936
Live stock and vehicles	840
Gravel	235,452
Total	349,880

T T 7.

IMPROVEMENT OF HUMBOLDT HARBOR AND BAY, CALIFORNIA.

The history of this work is printed in the Annual Report of the Chief of Engineers for 1900, page 4237. All work authorized for the improvement of the entrance has been completed.

Preliminary examination, with a view to further improvement of the entrance to the bay, was authorized by the river and harbor act of March 2, 1907. For report of this examination and subsequent survey, see House Document No. 950, Sixtieth Congress, first session.

On March 25, 1908, contract was entered into with the San Francisco Bridge Company to enlarge a channel in front of Eureka to a depth of 18 feet and a width of 300 feet for a length of 6,200 feet, at 24.48 cents a cubic yard. Work was begun on June 8 and about 65,000 cubic yards of material have been removed to June 30, out of a total of about 320,000 cubic yards. The price paid is 24.48 cents per cubic yard.

Money statement.

July 1, 1907, balance unexpended	$92,317.95
June 30, 1908, amount expended during fiscal year for works of improvement	705.15
July 1, 1908, balance unexpended	91,612.80
July 1, 1908, outstanding liabilities	14,473.57
July 1, 1908, balance available	77,139.23
July 1, 1908, amount covered by uncompleted contracts	75,139.23
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	500,000.00

APPROPRIATIONS.

March 2, 1881	$40,000	June 11, 1896	$225,000
August 2, 1882	40,000	June 4, 1897	350,000
July 5, 1884	62,500	July 1, 1898	100,000
August 5, 1886	75,000	March 3, 1899	50,000
August 11, 1888	125,000	March 3, 1899	143,115
September 19, 1890	80,000	March 2, 1907	83,000
July 13, 1892	150,000		
March 3, 1893	522,000	Total	2,270,615
March 2, 1895	225,000		

CONTRACTS IN FORCE.

Contract dated March 25, 1908, for dredging 321,640 cubic yards of material from Humboldt Harbor, California.

Rate: 24.48 cents per cubic yard.

Name of contractor: San Francisco Bridge Company.

Date of commencement: June 8, 1908.

Date of completion: Work still in progress; will probably be completed about October 1, 1908.

Date of approval: April 18, 1908.

COMMERCIAL STATISTICS.

The following statement of the commerce of Humboldt Bay, California, for the year 1907 was collected and supplied by Mr. George A. Kellogg, secretary of the Humboldt Chamber of Commerce, at Eureka, Cal.:

Article.	Pounds.	Value.	Article.	Tons.	Value.
EXPORTS.			IMPORTS.		
Lumber	1,166,135,000	$7,702,205	General merchandise	139,584	$6,799,200
Produce	4,633,215	1,295,350	Coal	2,208	13,248
Manufactured articles	4,555,510	514,730	Hay	101	1,212
Miscellaneous	54,449,840	898,015	Fuel oil	12,192	50,800
			Miscellaneous	2,487	274,456
Total	1,229,723,565	10,410,300			
Tons	614,862		Total	156,572	7,138,916

T T 8.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

REMOVAL OF WRECK OF LIGHTER NO. 1.

On August 17, 1907, it was reported by E. L. McNoble, manager of the Napa Transportation Company, that a barge called *Lighter No. 1*, belonging to the American-Hawaiian Steamship Company, under charter to the Napa Gravel and Material Company, was sunk about 4 miles below the city of Napa in the Napa River and that it was a menace to navigation, and asked to have it removed. After several weeks of correspondence a release of it to the United States Government was obtained, and on December 26, 1907, an assistant

engineer was sent to Napa with the object in view of removing the wreck from the river. When he arrived at the site of the wreck he found a large keel schooner stranded on top of the wreck. This necessitated postponing the work as the owners of the schooner were making every effort to raise and remove it. The schooner had 160 cubic yards of gravel on deck and that was dumped off onto the wrecked barge, and in a few weeks the schooner was floated and removed.

On April 5, 1908, the assistant engineer again went to the wreck to remove it. The wrecked barge was 125 feet long and 35 feet beam and loaded with 300 tons of gravel. One end of the barge was out of the water at low water and he removed the gravel from one-half of the deck and then proceeded to break it up with giant powder. The barge was new and very strongly built. One-half of it was still heavily loaded with gravel which could not be removed as it was below low water. This necessitated using small blasts and many of them. Four hundred pounds of 60 per cent giant powder were used, and in all 110 blasts were fired, which broke up all of the timber down to the keelsons. As the deck was broken up the gravel fell through onto the bottom. All of the timber above the keelsons was removed, and as the bottom was covered with gravel and more than 4 feet of water over it at low water, it was not deemed necessary to remove that part of the wreck as it could not be in the way of navigation, and especially as the river has a rocky bottom with not more than 1 foot of water over it at low water 50 feet above where the wreck occurred. All navigation in this river is carried on at or near full tide, which is from 6 to 8 feet above low water.

All of the wreck has been removed that could interfere with navigation.

The total cost of removal of the wreck was $399.33.

APPENDIX U U.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND SAN FRANCISCO, CALIFORNIA, DISTRICT.

REPORT OF CAPT. THOS. H. JACKSON, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENT.

Sacramento and Feather rivers.

UNITED STATES ENGINEER OFFICE,
San Francisco, Cal., July 14, 1908.

SIR: I have the honor to forward herewith the annual report of the Board of Engineer officers for the improvement of the Sacramento and Feather rivers, California, for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

THOS. H. JACKSON,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

REPORT OF BOARD OF ENGINEERS.

UNITED STATES ENGINEER OFFICE,
San Francisco, Cal., June 30, 1908.

GENERAL: The Board of Engineers created by the act of Congress approved June 3, 1896, "for the purpose of making surveys and examinations" of the Sacramento and Feather rivers, to "submit the most feasible plan for the improvement of said rivers and the maintenance of navigation thereon, and to have charge of the work by them recommended as appropriations are made therefor," has consisted during the past fiscal year of Lieut. Col. John Biddle, Maj. C. H. McKinstry, and Capt. Thos. H. Jackson, Corps of Engineers.

For general information concerning the project for improvement attention is invited to the summary of this report.

For details concerning the operations during the past fiscal year attention is invited to the accompanying report of Capt. Thos. H.

Jackson, Corps of Engineers, secretary and disbursing officer of the Board, in immediate charge of the work.

JOHN BIDDLE,
Lieut. Col., Corps of Engineers.
C. H. MCKINSTRY,
Major, Corps of Engineers.
THOS. H. JACKSON,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

REPORT OF CAPT. THOS. H. JACKSON, CORPS OF ENGINEERS.

The operations during the fiscal year ending June 30, 1908, were confined to the Sacramento River. The work consisted of removing snags and other obstructions to navigation, and cutting trees on the banks of the stream, under the projects printed in the Annual Reports of the Chief of Engineers for 1898 (pp. 2944–2945) and for 1899 (pp. 3171–3181).

This work has been carried on by hired labor, using the U. S. snag boat *Seizer*, with a crew of about 35 men, and the new United States snag scow (constructed and equipped during the past winter), with a crew of about 10 men.

At the close of the last fiscal year the U. S. snag boat *Seizer* was removing snags and other obstructions from the Sacramento River in the vicinity of Jacinto, 189 miles above the mouth of the river. These operations were continued downstream as far as Threemile Slough, about 10 miles above the mouth of the river, until October 22, 1907, on which date the snag boat was tied up for the winter months at Sacramento.

The snag boat was placed in commission again on June 23, 1908, and from that date to June 30, 1908, was engaged in removing snags and other obstructions in the Sacramento River between Chico Landing and Colusa.

The work done by the snag boat during the past year is shown in the following statement:

	Between Collinsville and Sacramento (61 miles).	Between Sacramento and Colusa (92 miles).	Between Colusa and Chico Landing (57 miles).	Total.
Logs, trees, stumps, and snags blasted or removed from river	85	101	1,054	1,240
Trees and stumps cut on banks	91	375	532	998
Number of shots fired	56	51	495	602
Dynamite used ....pounds	312	418	2,482	3,212
Days snag boat was in commission	12	31	80	123
Miles run by snag boat	121	453	595	1,169

The new snag scow was placed in commission on April 6, 1908, with a crew of 10 men, and on that date left Sacramento in tow of a steamboat for the upper Sacramento River. From that date to June 30, 1908, the scow was engaged in removing snags and other obstructions from the stream between Sacramento bar, 9 miles below the head of navigation, at Red Bluff, and Jacinto Chute, 70 miles below Red Bluff.

The work done by the snag scow during the past year is shown in the following statement:

	Between Collin-ville and Sacramento (61 miles).	Between Sacramento and Colusa (92 miles).	Between Colusa and Chico Landing (57 miles).	Between Chico Landing and Red Bluff (52 miles).	Total.
Logs, trees, stumps, and snags blasted or removed from river			2	173	175
Trees and stumps cut on banks				5	5
Number of shots fired			5	804	809
Dynamite used ..... pounds			50	5,980	6,030
Days snag scow was in commission			19	67	86

The crew of the snag scow drove 85 piles for a wing dam at Jacinto Chute, and cut and placed the necessary brush in the wing dam.

The new snag scow placed in commission the past year was designed for work in the Sacramento River between Red Bluff and Colusa. The hull was built at Oakland, Cal., during the past winter under a contract with W. A. Boole & Son, of San Francisco, the contract price for the hull, including the "A" frame, spuds, spud hoisting frame, and derrick boom being $4,270. The hull was built of Oregon fir. It is 64 feet long, 28 feet wide, and 3½ feet deep.

After the hull was completed at Oakland it was towed to Sacramento and equipped with the necessary machinery and house for the men. The total cost of the scow, equipped ready for work, was $6,525.62.

Minor repairs were made the past year to U. S. snag boat *Seizer*.

The projected least low-water channel depth of 7 feet in the Sacramento River from its mouth up to the city of Sacramento has existed the past year; also the projected least low-water depths of 4 to 5 feet from the city of Sacramento up to Colusa.

The low-water depths of 2 to 2½ feet from Colusa up to Red Bluff have also been maintained. The navigation in the upper 60 miles or so of the Sacramento River is said to be the best that has existed for many years. It will be necessary to remove snags, etc., each year to keep the upper portion of the stream open for navigation.

The sum of $25,000 is required to be expended annually in removing snags, cutting trees, and constructing wing dams, in order to maintain the channel depths required by the project for improvement.

Money statements.

SACRAMENTO AND FEATHER RIVERS, CALIFORNIA.

July 1, 1907, balance unexpended	$51,335.86
June 15, 1908, amount received from sales	47.03
	51,382.89
June 30, 1908, amount expended during fiscal year for works of improvement	31,689.20
July 1, 1908, balance unexpended	19,693.69
July 1, 1908, outstanding liabilities	2,397.28
July 1, 1908, balance available	17,296.41

Amount (estimated) required for completion of existing project	Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	$25,000.00

SACRAMENTO RIVER, CALIFORNIA.

July 1, 1907, balance unexpended	$18,658.24
July 1, 1908, balance unexpended	18,658.24

APPROPRIATIONS.

SACRAMENTO AND FEATHER RIVERS, CALIFORNIA.

March 3, 1875	$15,000.00	
June 18, 1878	15,000.00	
March 3, 1879	20,000.00	
June 14, 1880	45,000.00	
March 3, 1881	60,000.00	
August 2, 1882	250,000.00	
July 5, 1884	40,000.00	
August 11, 1888	20,000.00	
September 19, 1890	30,000.00	
July 13, 1892	150,000.00	
August 18, 1894	115,000.00	
June 13, 1902	25,000.00	
April 28, 1904 (allotted)	22,000.00	
March 2, 1907	50,000.00	
Received from sales	1,774.43	
		$858,774.43

SACRAMENTO RIVER, CALIFORNIA.

March 3, 1899	$30,000.00	
June 6, 1900	60,000.00	
Received from sales	16.16	
		90,016.16
Total		948,790.59

CONTRACT IN FORCE.

Abstract of emergency contract in force during fiscal year ending June 30, 1908, for constructing one snag scow.

Name of contractor, W. A. Boole & Son (Incorporated); contract dated September 23, 1907; work to be begun by October 23, 1907, and to be completed by January 23, 1908. The contract provided that the contractor should construct and deliver at Oakland, Cal., one scow 64 feet long, 28 feet wide, and 3½ feet deep, including "A" frame, spuds, spud hoisting frame and derrick boom, for $4,270. The contract was completed on January 8, 1908.

COMMERCIAL STATISTICS.

The freight and passenger traffic on the Sacramento and Feather rivers the past year was handled by about 35 steamboats, 50 gasoline boats and launches, 35 barges, and in the lower portions of the Sacramento River by a number of gasoline and sail schooners.

The principal steamboat lines operating regularly report that they carried 367,224 tons of freight and 67,715 passengers during the year ending December 31, 1907.

The above does not include the freight carried by numerous craft which ply at irregular intervals, nor the passengers carried by various launches plying between different points. It has been impracticable to obtain complete returns, especially as to the number of passengers carried. It is known, however, that approximately 400,600 tons of freight and 150,000 passengers were carried during the year.

APPENDIX V V.

IMPROVEMENT OF RIVERS AND HARBORS IN THE FIRST PORTLAND, OREGON, DISTRICT.

REPORT OF LIEUT. COL. S. W. ROESSLER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Coquille River, Oregon, from Coquille to mouth.
2. Entrance to Coos Bay and Harbor, Oregon.
3. Coos River, Oregon.
4. Tillimook Bay and bar, Oregon.
5. Dredging plant for use at harbors on coasts of Oregon and Washington.
6. Snake River, Oregon, Washington, and Idaho.
7. Columbia River and tributaries between Celilo Falls and mouth of Snake River, Oregon and Washington.
8. Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington.
9. Canal at the Cascades, Columbia River, Oregon.
10. Operating and care of canal and locks at the Cascades of the Columbia River, Oregon.
11. Columbia River between Vancouver, Washington, and mouth of Willamette River.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., July 9, 1908.

SIR: I have the honor to transmit herewith annual report * * * for the fiscal year ending June 30, 1908, pertaining to "improvement of rivers and harbors in western Oregon and of Columbia River above the mouth of Willamette River, including Snake River, Oregon, Washington, and Idaho," in my charge.

Very respectfully, your obedient servant,

S. W. ROESSLER,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

V V 1.

IMPROVEMENT OF COQUILLE RIVER, OREGON, FROM COQUILLE CITY TO MOUTH.

Information concerning the project for the construction of jetties at the mouth of the Coquille River is given in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

A contract of June 30, 1907, with Robert Wakefield provides for extending the north jetty 285 feet seaward. The jetty is built of rubblestone, 50 pounds to 10 tons in weight, deposited from a double-track trestle built in advance of the enrockment. The enrockment is raised to the level of high tide. No mattresses are used. The stone comes from a quarry near by, owned by the Government, and is put in the jetty at $1.65 per ton. When work began in July, 1907, the outer end of the jetty tramway for a distance of about 100 feet had been carried away and the enrockment more or less beaten down the whole length of the jetty. The necessary repairs being made in the tramway, the first stone was placed in November, 1907. At the end of the fiscal year 22,840 tons of rock had been placed, $38,300 expended in the contract, and the jetty extended a farther distance of 150 feet, leaving 135 feet to be done to complete the present contract. The contract will be completed the present season.

Money statement.

July 1, 1907, balance unexpended	$63,224.01
June 30, 1908, amount expended during fiscal year for works of improvement	32,210.33
July 1, 1908, balance unexpended	31,013.68
July 1, 1908, outstanding liabilities	10,700.00
July 1, 1908, balance available	20,313.68
July 1, 1908, amount covered by uncompleted contracts	13,448.00

APPROPRIATIONS.

June 14, 1880	$10,000	June 3, 1896	$20,000
August 2, 1882	10,000	March 3, 1899	40,000
July 5, 1884	10,000	June 13, 1902	30,000
August 5, 1886	20,000	March 3, 1905	55,000
August 11, 1888	25,000	March 2, 1907	60,000
September 19, 1890	30,000		
July 13, 1892	25,000	Total	355,000
August 18, 1894	20,000		

CONTRACT IN FORCE.

Formal:

Name of contractor: Robert Wakefield, Portland, Oreg.

Date of contract: June 20, 1907.

Character: Jetty work.

Approximate quantities (in place), with prices:

5,000 linear feet piles, at 20 cents	$1,000
40,000 feet B. M. lumber, at $20	800
400 pounds ship spikes, at 6 cents	24
2,500 pounds driftbolts, at 5 cents	125
12 tons old rails, relaid, at $12	144
800 pounds new railroad spikes, at 6 cents	48
1 new frog and switch	125
30,000 tons stone, at $1.65	49,500
150 pounds new bolts and nuts, at 8 cents	12

Approved: Contract authorized by telegram dated Office Chief of Engineers, June 18, 1907.

Date of beginning: Thirty working days after date of notification of approval.

Date of expiration: Eighteen months after date of notification of approval.

COMMERCIAL STATISTICS.

The following commerce was carried by vessels across the bar at the mouth of the Coquille River during the year ending December 31, 1907:

Articles.	Inbound.	Outbound.
	Tons.	*Tons.*
Broom handles	16	226
Cord wood	.....	363
Coal	.....	10
Dairy produce	.....	180
Grain	35	.....
Hay	30	.....
Lumber	.....	46,996
Machinery	90	15
Match wood	.....	2,742
Miscellaneous	5,574	1,432
Poles	.....	525
Shingles	.....	2,189
Vegetables	15	20
Wool and woolen goods	10	37
Total	5,770	54,734

Number of passengers arrived by sea, 136; departed by sea, 193; total, 329.

List of vessels crossing bar at entrance of Coquille River, Oregon, during the year ending December 31, 1907.

Name.	Net tonnage.	Depth.	Name.	Net tonnage.	Depth.
		Feet.			*Feet.*
Advance	171	8.5	Mayflower	86	6.2
Albion	75	5.0	Monterey	119	7.5
Bandon	592	11.0	Oregon	304	9.9
Bender Brothers	80	6.8	Prosper	52	9.6
Bessie K	93	7.6	Rita Newman	120	8.6
Bowdoin	681	13.6	Ruby	306	9.0
Chinook	771	9.7	San Buena Ventura	171	8.5
Coquille	97	6.4	Sotoyome	394	10.0
C. T. Hill	133	7.5	Washcalore	303	10.0
Elizabeth	284	9.9	Wellesley	665	13.8
Lizzie Prien	91	6.4			

V V 2.

IMPROVEMENT OF ENTRANCE TO COOS BAY AND HARBOR, OREGON.

For information concerning the approved project for the improve- of Coos Bay and Harbor, Oregon, attention is invited to the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

No active operations were carried on during the past fiscal year other than the care of the Government plant and the planting, last April, on the north spit, of an area of about 50 acres with Holland grass (Arunda Arenaria). The grass roots for this planting were obtained from adjacent plantations of former years.

The condition of the north jetty remains nearly the same as reported last year. The jetty enrockment was very slightly beaten down by the sea during the winter. The jetty tramway and wharf have been completely destroyed by the teredo and decay.

Money statement.

July 1, 1907, balance unexpended	$25,275.99
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,444.94
July 1, 1908, balance unexpended	23,831.05
July 1, 1908, outstanding liabilities	70.00
July 1, 1908, balance available	23,761.05

APPROPRIATIONS.

March 3, 1879	$40,000.00	March 3, 1899	$150,000.00
March 3, 1881	30,000.00	June 13, 1902	50,000.00
August 2, 1882	30,000.00	Received from other sources	264.04
July 5, 1884	30,000.00		
August 5, 1886	33,750.00		
August 11, 1888	50,000.00	Total	939,014.04
September 19, 1890	125,000.00	April 5, 1905, allotted to Coos River	3,000.00
July 13, 1892	210,000.00		
August 18, 1894	95,000.00		
June 3, 1896	95,000.00	Aggregate	936,014.04

COMMERCIAL STATISTICS.

The following commerce was carried by vessels across the bar at the entrance to Coos Bay during the year ending December 31, 1907:

Articles.	Inbound.	Outbound.
	Tons.	*Tons.*
Broom handles	.....	54.5
Coal	.....	27,192.0
Chittim bark	84.0	152.0
Dairy produce	6.5	255.5
Eggs	6.0	.....
Fruit	429.5	794.0
Fish	815.0	.....
Grain	608.0	.....
Hay	269.5	.....
Laths	.....	38.0
Lumber	.....	82,489.5
Live stock	4.0	.....
Machinery	833.0	8.0
Match wood	.....	197.5
Miscellaneous	36,449.0	14,327.0
Piles	.....	2,000.0
Vegetables	317.5	137.0
Wool and woolen goods	65.0	30.0
Total	39,887.0	127,675.0

Number of passengers arrived by sea, 7,917; departed by sea, 5,991; total, 13,908.

2000

List of vessels crossing the bar at entrance to Coos Bay, Oregon, during the year ending December 31, 1907.

Name.	Net tonnage.	Depth.	Name.	Net tonnage.	Depth.
		Feet.			*Feet.*
Advent	399	12.6	Juno	20	5.8
Alliance	431	12.0	Katie Cook	19	5.8
Annie Larson	326	11.0	Letitia	233	10.4
Arago	476	12.2	L. Roscoe	75	9.0
Bandon	592	11.0	Lucy	294	9.0
Bertie Minor	230	9.8	Melville Dollar	1,103	14.0
Berwick	95	7.1	M. F. Plant	941	25.0
Beulah	339	10.9	North Bend	357	11.2
Bowdoin	681	13.6	Northwest	489	13.9
Breakwater	793	19.8	Novelty	584	13.0
Carmel	401	12.3	Oakland	296	10.9
Casco	539	12.6	Oceania Vance	384	11.3
Chinook	771	9.7	Omega	522	13.5
Coaster	430	17.0	Orient	296	10.9
Compeer	308	11.2	Perry	(a)	(a)
C. S. Holmes	376	11.5	Preble No. 12	229	(a)
Czarina	793	14.1	Queen	201	10.0
Echo	650	15.0	Rainier	519	13.6
Encore	572	14.0	R. D. Inman "1"	670	14.0
Esther Buhne	245	9.0	Redondo	462	11.5
F. A. Kilburn	458	21.0	Repeat	410	12.0
F. P. Ripley	190	16.6	Retriever	470	13.5
F. S. Loop	689	13.6	Robarts	24	6.5
Fulton	265	11.4	Salvator	385	11.6
Gleaner	392	11.0	Sampson	189	15.6
Guide	137	7.4	San Gabriel	312	11.0
Harriet G	188	10.5	Sausalito	326	10.0
Heather	142	14.9	Sea Rover	116	15.0
Hugh Hogan	355	9.8	Signal	392	13.8
Hunter	52	10.4	Sotoyome	398	10.3
Ivy	135	8.8	Tamalpais	422	13.0
James A. Garfield	300	10.2	Thomas L. Wand	413	12.3
Jim Butler	343	12.6	Virginia	541	12.8
J. M. Weatherwax	365	11.4	Washcalore	303	10.0
J. Marhoffer	450	.....	Wellesley	665	13.8
Johan Poulsen	453	13.5	Wizard	69	11.4
John D. Spreckels	253	10.9	Wrestler	409	13.8

[a] Not known.

V V 3.

IMPROVEMENT OF COOS RIVER, OREGON.

The project for obtaining a channel 50 feet wide, free from obstructing bowlders and snags, from the mouth of the river in Coos Bay to the head of tide on the North and South forks, and the result of operations are mentioned in the Annual Report of the Chief of Engineers for 1900, pages 644–645, 4283–4284.

OPERATIONS DURING THE FISCAL YEAR 1908.

At the close of the last fiscal year the work of removing snags from Coos River was in progress. The work was carried on by hired labor and the Government snag scow until September 27, 1907, when the plant was put away and the scow moored just above Marshfield.

The work resulted in the clearing of the channel to head of navigation on both the North and South forks.

In addition to the snagging the dredge bucket was rigged on the scow and the channel dredged to 3 feet at low water at the Carpenter and Yokam bars on the South fork, and to the same depth at Piper, Blaine, and Edwards Landing shoals on the North Fork. The channels cut were at least 40 feet wide and the removed material was placed along the sides of the cuts.

The following is a summary of the work done during the season:

Snagging.

Snags removed from North Fork	number	629
Trees removed from North Fork	do	3
Snags removed from South Fork	do	385
Rocks removed from South Fork	do	50
Snags removed from main river	do	96
Total number of obstructions removed during season of 1907		1,163

Dredging.

Material dredged from shoals in North Fork	cubic yards	8,259
Material dredged from shoals in South Fork	do	5,148
Total material dredged	do	13,407

There is a small balance available which is perhaps sufficient to remove any snags which the freshets of last winter may have carried into the channel, but not sufficient to do any dredging.

It requires about $3,000 every two years to maintain this improvement.

Money statement.

July 1, 1907, balance unexpended	$3,633.70
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,970.00
July 1, 1908, balance unexpended	1,663.70
July 1, 1908, balance available	1,663.70
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	1,500.00

APPROPRIATIONS.

June 3, 1896	$5,000
March 3, 1899	3,000
June 13, 1902	2,000
April 5, 1905, allotted from "Improvement of Coos Bay and Harbor, general improvement"	3,000
March 2, 1907	3,000
Total	16,000

COMMERCIAL STATISTICS.

The following commerce was carried by vessels plying Coos River during the year ending December 31, 1907.

Articles.	Inbound.	Outbound.
	Tons.	Tons.
Cord wood	240	471
Coal	708	[illegible]
Chittim bark		33
Dairy produce		2,772
Eggs		21
Fruit	6	657
Fish		33
Grain	307	5
Hay	60	[illegible]
Lumber	905	
Logs		[illegible]

The following commerce was carried by vessels plying Coos River during the year ending December 31, 1907—Continued.

Articles.	Inbound.	Outbound.
	Tons.	*Tons.*
Live stock	306	394
Machinery	127	43
Miscellaneous	1,285	2,281
Piles	.....	5,272
Spars	.....	42
Vegetables	28	862
Total	3,972	38,101

Number of passengers carried up river, 18,592; number of passengers carried down river, 19,101; total, 37,693.

List of steamers which regularly operated on Coos River during the year ending December 31, 1907.

Name.	Character.	Net tonnage.	Depth.
			Feet.
Alert	Stern-wheel	81	3.4
Coos River	Steam, screw	8	5.0
Curlew	Gasoline	8	3.5
Express	do	10	3.6
Juanita	do	9	3.0
Sumner	do	.....	4.0
Sunrise	do	a10	3.5
Telephone	do	7	3.0
Tioga	do	8	3.4

a Estimated.

In addition to the above-named, there are several gasoline boats and launches in the stream owned and operated by farmers living in the valley. Owing to the formation of the country, transportation other than by water is at present impracticable. The stream is therefore used as a highway for transporting practically all the commerce and passengers of the region.

V V 4.

IMPROVEMENT OF TILLAMOOK BAY AND BAR, OREGON.

Information concerning the completed project for obtaining a least depth of 9 feet at mean high tide in the channel between Hobsonville, on Tillamook Bay, and Tillamook city, on Hoquarten Slough, as well as the results of operations in former years, is given in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

At the close of last fiscal year the work of snagging Hoquarten Slough, which had been commenced May 16, was in progress. This work was done by hired labor, with the Government plant, and extended over 5 miles of the channel, from the town of Tillamook to a point below Dicks Point. Three hundred and forty-two large and 2,734 small snags were removed, and 48 overhanging trees were cut away. The snagging work closed July 20, 1907, and cost about $1,500.

On July 25 the dredge was rigged and the work of redredging the shoal places in the channel from the mouth of the Trask River to Bay City to maintain the projected depth was begun.

The following is a summary of the work done:

	Cubic yards removed.
Shoal at mouth of Trask River	6,270
Shoal at Junction Jetty	9,333
Shoal between Dicks Point and Memaloose Point	9,533
Bay City Cut	8,922
Total	34,058

This dredging was done by hired labor, and resulted in the restoration of the channel to 11 feet at ordinary high tide from Tillamook to Bay City. On December 15, 1907, the dredge plant was put away at the Government moorings in Blind Slough.

Early in May, 1908, the dredge was put into commission to remove snags and the worst shoals from the channel as far as the small available balance will permit. This work is now in progress.

In accordance with the provisions of the river and harbor act of March 2, 1907, an examination and survey was made of Tillamook Bay. The report on this survey, which was made last July and August, is published in House Document No. 965, Sixtieth Congress, first session.

The controlling dikes constructed by the Government in past years in Tillamook Bay are more or less out of repair. It is estimated that the sum of $15,000 will be required for the next two years to repair the existing dikes by the addition of piles, brush, and stone, and to maintain, by dredging, the depth in the bay channel.

Money statement.

July 1, 1907, balance unexpended	$8,766.66
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	6,285.83
July 1, 1908, balance unexpended	2,480.83
July 1, 1908, outstanding liabilities	548.00
July 1, 1908, balance available	1,932.83
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	15,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 11, 1888	$5,200.00	June 13, 1902	$27,000.00
September 19, 1890	500.00	March 3, 1905	10,000.00
July 13, 1892	15,000.00	March 2, 1907	10,000.00
August 18, 1894	16,000.00	Receipts from sales	20.00
June 3, 1896	17,000.00		
March 3, 1899	25,000.00	Total	125,724.68
November 10, 1900 (refundment of overpayment)	4.68		

COMMERCIAL STATISTICS.

The following commerce was carried by vessels across the bar at the entrance to Tillamook Bay, Oregon, during the year ending December 31, 1907:

Articles.	Inbound.	Outbound.
	Tons.	*Tons.*
Lumber	1,005	9,478
Machinery	2,600	.....
Match wood	740	340
Miscellaneous	6,735	2,019
Total	11,080	11,837

Number of passengers arrived by sea, 797; departed by sea, 682; total, 1,479.

List of vessels crossing the bar at entrance to Tillamook Bay, Oregon, during the year ending December 31, 1907.

Name.	Net tonnage.	Depth.	Name.	Net tonnage.	Depth.
		Feet.			*Feet.*
Antelope[a]	117	7.0	Ivy[a]	135	8.8
Coquille River[a]	265	12.4	Northwest[b]	489	13.9
Evie[b]	79	5.9	Orient[a]	296	10.0
Gerald C.[b]	18	7.0	Queen[a]	217	10.0
Gotama[a]	188	8.6	Sue H. Elmore[b]	131	9.0
Guide[a]	137	7.4	Wallacut[a]	674	14.0
Ida Schmaver[a]	204	9.0			

[a] To and from Hobsonville, Oreg. [b] To and from Tillamook, Oreg.

V V 5.

IMPROVING THE VARIOUS HARBORS ON THE COASTS OF OREGON AND WASHINGTON BY THE CONSTRUCTION AND EQUIPMENT OF A DREDGING PLANT FOR USE THEREON.

The river and harbor act of March 2, 1907, appropriated $100,000 for the construction of this dredge and a contract was entered into with the Portland Iron Works, of Portland, Oreg., under date of January 24, 1908, for building the dredge in accordance with the plans and specifications. The contract price is $79,340, not including equipment. The dredge is to have an 18-inch suction, discharging through pipes supported on pontons. The hull is 120 feet long, 36 feet wide, and 11 feet deep.

The contractors have made splendid progress on the work and at the close of the year the hull had been launched and considerable progress made on the machinery, which is nearly ready to be installed. It is believed that the dredge will be finished and ready to go into commission by the last of August.

The estimated cost of operations is $5,000 per month for the first three years and $6,000 per month thereafter. This estimate includes towage, docking, and such other repairs as may reasonably be expected from time to time.

Money statement.

July 1, 1907, balance unexpended	$100,000.00
June 30, 1908, amount expended during fiscal year for works of improvement	34,460.27
July 1, 1908, balance unexpended	65,539.73
July 1, 1908, outstanding liabilities	31,603.00
July 1, 1908, balance available	33,936.73
July 1, 1908, amount covered by uncompleted contracts	16,702.00

APPROPRIATION.

March 2, 1907 ..... $100,000

CONTRACT IN FORCE.

Formal:

Name of contractor: Portland Iron Works, Portland, Oreg.
Date of contract: January 24, 1908.
Character: Constructing and delivering one 18-inch hydraulic dredge.
Price, with extra parts: $81,274.
Approved: February 12, 1908.
Dates of beginning and expiration: Work to be commenced within ten days and be completed within eight months from date of notification of approval of contract.

V V 6.

IMPROVEMENT OF SNAKE RIVER, OREGON, WASHINGTON, AND IDAHO.

For details of this project, with status of improvement, attention is invited to the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

The self-propelling dredge *Wallowa* began raking gravel bars between Lewiston and Riparia in July, and by the 1st of September had restored the good depth of 40 inches at low water obtained the year before. No further work being required in that stretch of river, the dredge was operated the remainder of the season in the Snake River below Riparia and on the Columbia River between Homily Rapids and Priest Rapids until laid up for repairs at Riparia in April.

Two drill scows, each 60 feet long by 20 feet beam by 3½ feet depth of hold, costing, with derricks, hoisting machinery, steam drills, etc., about $7,000 each, were built under the appropriation of the State of Washington for removing ledges in the Snake River below Riparia. One of these scows was operated on Texas Rapids from October 1 until work was stopped by ice and freshet early in February. The

second scow was operated at Texas Rapids, Palouse Rapids, and Five Mile Rapids until work was suspended by ice in the early part of February.

The total work of the season may be summarized as follows:

Five hundred and eleven rakes were made over gravel bars between Riparia and Lewiston, 70 rakes at Texas Rapids, and 77 rakes at Pine Tree Rapids; 1,934 cubic yards of ledge were removed from Texas Rapids; 10 cubic yards from Hunters Rapids; 1,020 cubic yards from Palouse Rapids; 2 cubic yards from Monumental Rapids; 366 cubic yards from Pine Tree Rapids, and 261 cubic yards from Five Mile Rapids.

In the absence of a suitable boat as tender, a 25-horsepower gasoline launch was purchased under the State appropriation and used as dispatch boat. It answered the purpose very well though a larger craft would have been more useful.

The *Wallowa* was hauled out on the ways at Riparia and her hull and machinery repaired during the month of April.

There have been no boats running above Lewiston and no work has been done above that point.

It is estimated that in addition to funds now available the sum of $12,000 can profitably be expended on the Snake River above Riparia during the next two years.

Money statements.

FEDERAL APPROPRIATION.

July 1, 1907, balance unexpended	$10,180.98
Refundment of overpayment	.75
	10,181.73
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	5,923.35
July 1, 1908, balance unexpended	4,258.38
July 1, 1908, outstanding liabilities	10.20
July 1, 1908, balance available	4,248.18
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	10,000.00

STATE APPROPRIATION.

July 1, 1907, balance unexpended	$100,000.00
June 30, 1908, amount expended during fiscal year, for works of improvement	47,377.31
July 1, 1908, balance unexpended	52,622.69
July 1, 1908, balance available	52,622.69

APPROPRIATIONS.

July 18, 1878	$20,000.00	June 13, 1902 (allotted)	$5,500.00
March 3, 1879	20,000.00	March 3, 1905	25,000.00
June 14, 1880	15,000.00	March 2, 1907	10,000.00
March 3, 1881	15,000.00		
August 2, 1882	6,000.00		261,544.41
July 5, 1884	20,000.00	Receipts from sales	825.70
August 5, 1886	10,000.00	Refundment of overpayment	.75
August 11, 1888	10,000.00		
September 19, 1890	20,000.00		
July 13, 1892	15,000.00	Total	262,370.86
August 18, 1894	5,000.00	Appropriated by State of Washington	100,000.00
June 3, 1896	5,000.00		
March 3, 1899	7,500.00		
June 13, 1902	40,250.00	Total	362,370.86
June 13, 1902, balance transferred from improvement of Clearwater River, Idaho	12,294.41		

COMMERCIAL STATISTICS.

The following commerce was carried on the Snake River during year ending December 31, 1907:

Article.	Tons.	Article.	Tons.
Wheat	21,793	Cattle and horses	125
Other cereals	7,717	Sheep and hogs	35
Flour	639	Wool	299
Hay	72	Fruit	709
Stone	25	Other articles	2,286
Railroad iron	20		
General merchandise	5,208	Total	39,228
Lumber	300		

Number of passengers carried, 14,540.

V V 7.

IMPROVEMENT OF COLUMBIA RIVER AND TRIBUTARIES ABOVE CELILO FALLS TO THE MOUTH OF THE SNAKE RIVER, OREGON AND WASHINGTON.

OPERATIONS DURING THE FISCAL YEAR 1908.

During the year plans were completed for a light-draft steamboat suitably equipped for raking gravel bars and removing ledges and bowlders, and a contract for its construction made. At the end of the fiscal year the boat is approximately 50 per cent completed. A drill scow was constructed during the year under an appropriation by the State of Washington and employed from October 19 to March 15 in removing ledges from the upper end of Umatilla Rapid. The work of the scow consisted in drilling 2,796 holes and removing 1,206 cubic yards of ledge. The steamer *Wallowa* drilled 145 feet of holes and removed 43 cubic yards of ledge from Homily Rapids.

In addition to the foregoing work the steamer *Wallowa* was sent, upon urgent request of navigation interests between Kennewick and

Priest Rapids, to deepen several bars between the points named during the very low-water season of January and February. This latter work, which consisted in making 328 rakings of gravel bars and removing 40 cubic yards of ledge, was done under the appropriation of the State of Washington. Much benefit is said to have resulted, so that navigation could be carried on without interruption at an unusually low stage of river and a community served that had no other means of communication with the outside world.

Money statement.

FEDERAL APPROPRIATION.

July 1, 1907, balance unexpended	$119,045.65
June 30, 1908, amount expended during fiscal year for works of improvement	33,096.75
July 1, 1908, balance unexpended	85,948.90
July 1, 1908, outstanding liabilities	3,259.00
July 1, 1908, balance available	82,689.90
July 1, 1908, amount covered by uncompleted contracts	27,622.00
Amount (estimated) required for completion of existing project	280,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	75,000.00

STATE APPROPRIATION.

July 1, 1907, balance unexpended	$25,000.00
June 30, 1908, amount expended during fiscal year for works of improvement	13,159.66
July 1, 1908, balance unexpended	11,840.34
July 1, 1908, outstanding liabilities	618.00
July 1, 1908, balance available	11,222.34

APPROPRIATIONS.

June 10, 1872	$50,000	Appropriation by State of Washington	$25,000
June 23, 1874	20,000		
March 3, 1875	35,000		
August 14, 1876	15,000	Total	265,000
March 2, 1907	120,000		

CONTRACTS IN FORCE.

Emergency:

Name of contractor: Joseph Supple, Portland, Oreg.

Date of contract: April 25, 1907.

Character: Furnishing and delivering three scows.

Price: $9,825 for three scows.

Approval: Contract authorized by Chief of Engineers April 9, 1907.

Dates of beginning and expiration: Work to be commenced within ten days and scows to be delivered within one hundred days from date of contract.

Emergency:
Name of contractor: Tatum & Bowen, Portland, Oreg.
Date of contract: April 27, 1907.
Character: Furnishing and delivering three hoisting engines.
Price: $4,221 for three engines.
Approval: Not required.
Dates of beginning and expiration: Engines to be delivered within ninety days from date of contract.

Emergency:
Name of contractor: O. F. Graves, Portland, Oreg.
Date of contract: May 27, 1907.
Character: Furnishing and delivering one gasoline launch.
Price: $2,285.
Approval: Not required.
Dates of beginning and expiration: Launch to be delivered within one hundred and ten days from date of contract.

Formal:
Name of contractor: Willamette Iron and Steel Works, Portland, Oreg.
Date of contract: January 29, 1908.
Character: Constructing and delivering one steamboat.
Price: $55,395.
Approved: February 12, 1908.
Dates of beginning and expiration: Work to be commenced within ten days and be completed within one hundred and eighty days from date of notification of approval of contract.

COMMERCIAL STATISTICS.

The following commerce was carried on the Columbia River above Celilo, Oreg., during the year ending December 31, 1907:

Articles.	Tons.	Articles.	Tons.
Wheat	1,786	Lumber	1,350
Other cereals	300	Shingles	2
Flour	70	Cattle and horses	323
Machinery	100	Sheep and hogs	20
Coal	300	Cement	500
Lime	40	Other articles	870
Hay	500		
Railroad iron	35	Total	7,776
General merchandise	1,580		

Number of passengers carried, 2,584.

List of vessels plying the upper Columbia and Snake rivers during the year ending December 31, 1907.

Name.	Net tonnage.	Depth.	Name.	Net tonnage.	Depth.
		Feet.			*Feet.*
Columbia	106	3.6	Spokane	421	6.3
Lewiston	518	6.0	Wallowa	200	5.0
Mountain Gem	282	5.0	W. R. Todd	105	3.8
Norma	452	5.6	Yakima	234	4.9
Relief	209	4.7			

V V 8.

IMPROVEMENT OF COLUMBIA RIVER BETWEEN THE FOOT OF THE DALLES RAPIDS AND THE HEAD OF CELILO FALLS, OREGON AND WASHINGTON.

For details of this work, with status of the project, attention is invited to the summary of this report and to report of Board of Engineers printed in the Annual Report of the Chief of Engineers for 1904, page 3475.

OPERATIONS DURING THE FISCAL YEAR 1908.

Robert Wakefield continued removal of rock at Three Mile Rapids under waiver of the time limit of his contract dated April 12, 1904. Work was commenced October 17, 1907, and the contract was completed March 16, 1908. Time worked, 137 days at location No. 3½ and 13 days at location No. 6. Total removed, 4,560.8 cubic yards of rock, whose top surface was originally above low water (class A), and 445.4 cubic yards of wholly submerged rock (class B). Total amount removed from beginning of contract, 41,832¼ cubic yards class A and 9,137⅓ cubic yards class B. Price paid was $1.50 per cubic yard for class A and $6.25 for class B.

Smyth & Jones continued construction of lock, boat basin, and canal entrance at Celilo under waiver of the time limit of their contract dated August 10, 1905. The freshet of 1907 overflowed the boat basin and deposited in it a large amount of silt which the contractors had to remove at their own expense. Work was resumed as soon as the freshet subsided, on August 12, 1907, and was continued until the freshet of 1908 rose above the floor of the boat basin on April 28. The work of the season included 16,315 cubic yards of sand and gravel excavation, 5,948 cubic yards of rock excavation, all of which was used in furnishing aggregate for concrete and making fills behind walls and for riprapping; 8,988 cubic yards of concrete were placed in the river wall of the boat basin, 4,873 cubic yards in the land wall, and 883 in the reenforced concrete floor. A tunnel 400 feet long for feeding the canal trunk below the lock above the boat basin was completed at a cost of $4,121.18 under supplemental agreement dated August 25, 1906.

The following is a detailed statement of the work on the canal during the fiscal year:

Common excavation, 16,689 cubic yards, at $0.37 per cubic yard	$6,175.38
Solid rock excavation, 6,965 cubic yards, at $0.90 per cubic yard	6,268.50
Sand excavation, 1,015 cubic yards, at $0.18½ per cubic yard	178.78
Concrete, 14,746 cubic yards, at $5.33 per cubic yard	78,596.18
Cast iron, 904 pounds, at $0.12½ per pound	113.00
Reenforcing rods, 45,873 pounds, at $0.0305 per pound	1,399.13
Asphaltic cement, 4,800 pounds, at $0.02½ per pound	120.00
Riprap, 1,299 cubic yards, at $1.85 per cubic yard	2,403.15
Drain tile, 147 linear feet, at $0.15 per linear foot	22.07
Tunnel, complete	4,121.18
Total	99,397.37

The following shows the general progress of the work since the beginning of the present contract:

Classification.	Estimated quantities.	Work done, fiscal year 1905-6.	Work done, fiscal year 1906-7.	Work done, fiscal year 1907-8.	Total to June 30, 1908.	Remaining work.
Concrete .....cubic yards..	33,000	3,973	4,583	14,746	23,302	9,698
Solid rock excavation ....do....	81,000	19,595	21,423	6,965	47,983	33,017
Common excavation ....do....	85,700	11,195	5,493	16,689	33,377	2,323
Sand excavation .....do....	9,500	2,028	4,428	1,015	7,471	2,029
Riprap .....do....	9,000	733	2,520	1,299	4,552	4,448

A little more than one-fourth of the work remains to be done to complete the contract, and it will probably take another low-water season, from August to middle of April, to complete it.

Plans for modifying certain details of the original project for the canal between Celilo and Big Eddy were approved by the Chief of Engineers under date of May 15, 1908. Under these plans the curvature of the canal axis is greatly reduced. Heavy masonry walls in gravel and sand sections are omitted and replaced by levee embankments lined with concrete. An extra lock is placed at Ten Mile Rapids in order to provide a means for backing the water up in one section of the canal trunk, and thus balance any upward pressure that might occur on the concrete floor of the canal as the rising river approaches the limit of navigation. These changes and others of lesser importance are fully set forth in the district officer's report of April 20, 1908.

Specifications have been prepared and forwarded for approval for continuing the canal prism to the head of Ten Mile Rapids under authorized funds.

A number of gauges have been set up between Celilo and Big Eddy for the purpose of determining the profile at the highest stage it may reach this year.

The State portage road has been operated but a small part of the year, as no suitable boats were available for operating in connection therewith. The steamer *J. N. Teal*, provided last year by the Open River Association to ply the river between Portland and Big Eddy, was partially burned during the year and has only lately been repaired and placed on the route.

Money statement.

July 1, 1907, balance unexpended	$462,696.40
Amount appropriated by sundry civil act approved May 27, 1908	336,000.00
Received from sales of blueprints	9.95
	798,706.35
June 30, 1908, amount expended during fiscal year, for works of improvement	131,941.25
July 1, 1908, balance unexpended	666,765.10
July 1, 1908, outstanding liabilities	16,270.00
July 1, 1908, balance available	650,495.10
July 1, 1908, amount covered by uncompleted contracts	100,888.00
Amount (estimated) required for completion of existing project	3,872,392.64
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	1,000,000.00

APPROPRIATIONS.

August 18, 1894	$100,000.00	March 2, 1907	$100,000.00
June 3, 1896	150,000.00	May 27, 1908	336,000.00
April 28, 1904	100,000.00	Receipts from sales	14.85
March 3, 1905	50,000.00		
June 30, 1906	250,000.00	Total	1,086,014.85

CONTRACTS IN FORCE.

Formal:

Name of contractor: Robert Wakefield, Portland, Oreg.
Date of contract: April 12, 1904.
Character: Excavating and removing rock.
Approximate quantities to be removed and excavated: 50,000 cubic yards of rock of class A (above low water); 7,000 cubic yards of rock of class B below low water).
Prices: $1.50 per cubic yard for rock of class A; $6.25 per cubic yard for rock of class B.
Approved: May 3, 1904.
Date of beginning: Thirty days after date of notification of approval.
Date of expiration: May 31, 1905.
Extension: Time for completion extended a reasonable period.

Formal:

Name of contractor: Smyth & Jones, Portland, Oreg.
Date of contract: August 10, 1905.
Character: Constructing portion of Dalles-Celilo Canal.
Approximate quantities (in place), with prices:

33,000 cubic yards plain concrete, at $5.33 per cubic yard.
81,000 cubic yards solid rock excavation, at 90 cents per cubic yard.
12,000 cubic yards sand excavation, at 18½ cents per cubic yard.
43,000 cubic yards common excavation, at 37 cents per cubic yard.
9,000 cubic yards hand-placed riprap, at $1.85 per cubic yard.
100 feet B. M. oak timber, at $87 per M feet B. M.
1,500 feet B. M. fir timber, at $37 per M feet B. M.
200 linear feet test and anchor holes, at $2.50 per linear foot.
3,000 pounds structural steel shapes, at 12½ cents per pound.
105,000 pounds medium steel reenforcing rods, at $3.05 per hundredweight.
2,000 pounds cast iron, at 12½ cents per pound.
2 roller valves, complete, at $2,400 each.
27 tons asphaltic cement, at $50 per ton.
1,000 linear feet drain tile, at 15 cents per linear foot.

Approved: September 2, 1905.
Date of beginning: Thirty days after notification of approval of contract.
Date of expiration: December 31, 1906.
Extension: Time for completion extended a reasonable period.

Supplemental agreement to above contract, dated August 25, 1906, provides that the contractor shall construct a culvert instead of digging the trench called for in specifications attached to original agreement.

Approved: September 12, 1906.

Supplement to above contract, dated October 16, 1906, provides that the United States shall rent one 5-ton locomotive to Smyth & Jones, at the rate of $30 per month.

Approved: November 7, 1906.
Expiration of supplemental agreement: Any time after April 20, 1907.

COMMERCIAL STATISTICS.

Statement of traffic handled by Oregon State Portage Railway, between Big Eddy and Celilo, during the year ending December 31, 1907.

	Tons.		Tons.
Wheat	1,800	Cattle and horses	2
Coal	1,200	Cement	1,085
General merchandise	482		
Lumber	31	Total	4,600

V V 9.

CANAL AT THE CASCADES, COLUMBIA RIVER, OREGON.

The project for overcoming the obstructions in the Columbia River at the Cascades, Oregon, and the results of operations in former years, are set forth in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

There have been no funds available for finishing uncompleted items of the approved project, and no construction has been in progress during the year. The expenditures actually made were for maintenance and for hire of 1 watchman.

The next important work to be undertaken toward completing the improvement is the erection of the land wall of the upper lock. The earth bank now takes the place of the lock wall, giving the basin a large capacity, which requires much time to fill and empty. The presence of this earth bank is further objectionable because it passes more or less seepage water, which tends to scour at the foundation of the wing wall. The estimated cost of this item is approximately $100,000.

Another important item is open-channel work below the lower entrance to the canal at points where navigation is endangered by reefs and bowlders, principally the latter, which are occasionally brought down by the strong rapids around the locks. As the locks are useful only as they can be reached over the stretch of river in question, the importance of maintaining a safe, open channel can not be overestimated. The sum of $5,000 could be advantageously expended in removing the worst of these obstructions, and these two items, together with $3,500 as estimated cost of a new office building, form the amount named in the money statement as a profitable expenditure.

Money statement.

July 1, 1907, balance unexpended	$2,259.85
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	770.10
July 1, 1908, balance unexpended	1,489.75
July 1, 1908, outstanding liabilities	60.00
July 1, 1908, balance available	1,429.75
Amount (estimated) required for completion of existing project	199,260.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	108,500.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

August 14, 1876	$90,000.00	June 3, 1896	$50,000.00
June 18, 1878	150,000.00	June 11, 1896	179,597.00
March 3, 1879	100,000.00	March 3, 1899	75,000.00
June 14, 1880	100,000.00	June 13, 1902	30,000.00
March 3, 1881	100,000.00	March 3, 1905	30,000.00
August 2, 1882	265,000.00	March 3, 1905 (allotted)	1,000.00
July 5, 1884	150,000.00		
August 5, 1886	187,500.00		3,809,000.00
August 11, 1888	300,000.00	Receipt from sales	11,629.48
September 19, 1890	435,000.00		
July 13, 1892	326,250.00	Total	3,820,629.48
March 3, 1893	1,239,653.00		

V V 10.

OPERATING AND CARE OF CANAL AND LOCKS AT THE CASCADES OF THE COLUMBIA RIVER, OREGON.

The canal and locks around the Cascades of the Columbia River are about 150 miles above the mouth of the latter in the Pacific Ocean, and, though not wholly finished, are able to pass steamboats drawing 8 feet of water. They were formally opened to navigation on November 5, 1896.

OPERATIONS DURING THE FISCAL YEAR 1908.

During the fiscal year the locks have been available continuously for the passage of river boats except on June 19, 20, and 21, when they were closed on account of high water, the river having reached reference No. 125.6, at which stage boats have difficulty in ascending the rapids below the lower entrance.

In September the river reached a very low stage and on account of the deposits in the upper entrance boats began to have trouble in entering and leaving the locks. This necessitated dredging, which was commenced on September 12. New spuds were fitted in the scow dredge and the machinery overhauled, two dump scows provided, and a small tug hired for towing the scows to the dumping ground. Dredging operations were continued until February 26, 1908, when the river began to rise. A total of 22,457 cubic yards of material was removed from the upper entrance and 555 cubic yards from the lower entrance. Some dredging had been previously done, but only sufficient to allow the passage of boats, and the deposits in the entrances are an accumulation of previous years.

It is considered very desirable to entirely clean out the entrances, and as the available dredge is not suitable for the purpose it is proposed to reconstruct it and do this work during the next low-water season. It is estimated that there are 50,000 cubic yards of material to be removed and that the total cost of doing the work will be approximately $14,000. An allotment of this amount has been made.

The sand-blasting machine and lighting plant, which were provided for in the previous year's estimate, were not installed, owing to the large amount of dredging that was required.

The locks, grounds, buildings, and machinery have been cared for throughout the year, nothing other than the usual renewal of cables, etc., being required.

Money statement.

July 1, 1907, balance unexpended	$7,804.63
Allotted July 6, 1907, $7,250, and October 30, 1907, $1,500	8,750.00
	16,554.63
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	14,569.34
July 1, 1908, balance unexpended	1,985.29
July 1, 1908, outstanding liabilities	418.00
July 1, 1908, balance available	1,567.29
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	7,250.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the *river and harbor* act of 1899.

ALLOTMENTS.

November 4, 1896	$2,500.00	July 8, 1903	$5,000.00
May 21, 1897	350.00	June 24, 1904	7,100.00
August 21, 1897	4,000.00	May 24, 1905	8,000.00
October 30, 1897	1,500.00	July 3, 1905	18,500.00
July 26, 1898	13,869.36	July 10, 1906	14,150.00
July 22, 1899	3,047.77	July 6, 1907	7,250.00
July 25, 1900	11,121.41	October 30, 1907	1,500.00
July 19, 1901	2,243.63		
July 12, 1902	5,500.00	Total	100,632.17

COMMERCIAL STATISTICS.

Summary of business, etc., during fiscal year ending June 30, 1908.

Month.	Average gauge readings, 8 a. m.		Number of lockages.	Number of passages.				
	Upper.	Lower.		Locks operated.	Stern-wheel.	Propeller.	Barge or sail.	Total.
1907.				h. m.				
July	116.2	101.7	134	33 25	143	.....	.....	143
August	107.0	89.1	171	36 05	175	7	1	183
September	108.2	83.3	166	27 40	178	3	4	185
October	99.9	78.3	125	22 55	130	1	2	133
November	97.6	76.4	91	19 05	90	3	3	96
December	98.2	76.5	86	17 50	88	2	.....	90
1908.								
January	97.0	74.5	75	15 35	70	7	2	79
February	96.1	72.7	68	20 52	66	2	4	72
March	100.0	78.8	55	9 10	54	1	2	57
April	104.2	85.2	66	13 05	62	4	.....	66
May	112.6	97.7	144	30 32	148	1	.....	149
June	120.7	107.2	108	22 52	111	.....	.....	111
Total	.....	.....	1,289	269 06	1,108	31	18	1,[illegible]

	Registered tonnage.	Freight carried.	Passengers.	Vessels delayed.	
1907.		*Tons.*	*Number.*	*Number.*	h. m.
July	59,963	4,458.25	16,164	[a]1	5 00
August	72,173	5,602.25	14,967	.....	.....
September	68,967	6,708.50	11,563	.....	.....
October	51,123	9,141.75	7,417	.....	.....
November	32,604	6,577.00	5,080	.....	.....
December	33,379	4,594.25	4,236	.....	.....
1908.					
January	28,832	3,604.25	3,719	.....	.....
February	27,076	4,611.25	3,410	[b]2	5 [illegible]
March	20,369	3,477.50	2,479	.....	.....
April	27,222	2,586.50	2,467	.....	.....
May	64,608	2,043.00	6,102	.....	.....
June	49,388	1,554.67	9,071	.....	.....
Total	535,694	54,954.17	86,615	4	10 [illegible]

[a] Delayed by broken cable. [b] Delayed by ice in canal.

Statement of traffic passing through canal at Cascades, Oregon, during fiscal year ending June 30, 1908.

BOUND UP.

Month.	Wheat.	Flour.	Miscellaneous grain.	Hay.	Cattle.	Horses.	Sheep.	Miscellaneous live stock.	Berries and fruit.	Lumber.	Miscellaneous merchandise.	Coal.	Total cargo.	Passengers.
1907.	*Pounds.*	*Pounds.*	*Pounds.*	*Tons.*	*Number.*	*Number.*	*Number.*	*Number.*	*Pounds.*	*Feet B. M.*	*Tons.*	*Tons.*	*Tons.*	*Number.*
July	.....	.....	.....	.....	5	127	.....	.....	2,500	5,700	3,590.25	.....	3,681.75	8,678
August	.....	1,000	67,000	33.25	11	78	.....	.....	3,000	137,500	3,530.25	.....	3,858.75	7,744
September	.....	4,500	.....	43.00	5	124	100	.....	.....	61,500	3,398.25	.....	3,620.75	5,861
October	.....	.....	18,400	32.00	3	160	12	.....	.....	18,754	4,617.00	.....	4,788.25	3,979
November	.....	7,500	8,000	41.75	9	80	.....	.....	.....	3,500	2,986.25	112.00	3,207.50	2,726
December	.....	12,400	22,700	29.75	4	110	.....	.....	.....	.....	2,449.75	.....	2,568.00	2,199
1908.														
January	40,000	14,500	99,000	75.75	2	61	.....	.....	.....	2,000	1,982.00	.....	2,177.50	2,012
February	.....	12,000	44,000	54.75	3	85	210	.....	.....	.....	1,680.25	.....	1,828.25	1,702
March	.....	.....	2,000	34.00	8	108	.....	.....	.....	42,001	1,210.75	.....	1,379.75	1,413
April	.....	.....	.....	23.00	12	194	.....	.....	.....	64,400	1,068.00	.....	1,315.00	1,524
May	.....	.....	4,500	19.00	12	224	.....	50	.....	20,944	988.00	.....	1,190.50	3,419
June	.....	.....	10,000	2.00	8	126	.....	.....	.....	21,460	678.00	.....	800.19	4,714
Total	40,000	51,900	275,600	388.25	82	1,477	322	50	5,500	377,759	28,178.75	112.00	30,416.19	45,971

BOUND DOWN.

Month.	Wheat.	Flour.	Miscellaneous grain.	Hay.	Cattle.	Horses.	Sheep.	Miscellaneous live stock.	Wool.	Berries and fruit.	Lumber.	Miscellaneous merchandise.	Total cargo.	Passengers.
1907.	*Pounds.*	*Pounds.*	*Pounds.*	*Tons.*	*Number.*	*Number.*	*Number.*	*Number.*	*Pounds.*	*Pounds.*	*Feet B. M.*	*Tons.*	*Tons.*	*Number.*
July	86,500	42,000	283,020	.....	39	206	.....	70	77,270	56,500	.....	345.50	771.50	7,486
August	1,198,350	24,900	251,030	.....	236	215	952	54	24,000	354,972	1,593	511.25	1,743.50	7,223
September	2,730,931	170,560	787,640	.....	544	290	5,011	133	.....	416,802	.....	321.75	3,087.75	5,702
October	4,509,091	252,200	615,850	.....	335	390	11,392	1,148	.....	181,085	1,000	507.25	4,353.50	3,438
November	4,849,675	37,770	298,170	.....	91	236	300	930	.....	225,200	.....	386.00	3,369.50	2,304
December	2,420,000	74,100	561,925	.....	46	100	.....	299	.....	92,715	.....	344.00	2,026.25	2,027
1908.														
January	1,537,000	65,200	410,785	.....	18	107	.....	140	.....	8,300	.....	328.00	1,426.74	1,707
February	3,953,175	6,900	628,875	10.00	4	132	300	.....	.....	16,100	.....	370.00	2,783.00	1,708
March	2,416,710	39,200	516,770	.....	11	203	.....	.....	.....	57,200	40,000	390.50	2,097.75	1,066
April	1,225,240	78,555	391,095	.....	15	268	.....	80	.....	.....	21,000	206.75	1,271.50	943
May	182,165	112,900	318,690	.....	67	383	.....	155	.....	2,000	8,667	247.50	852.50	2,683
June	84,000	136,040	197,690	.....	19	360	1,493	.....	.....	2,250	17,400	210.25	754.48	4,357
Total	25,192,837	1,040,325	5,261,540	10.00	1,425	2,890	19,448	3,009	101,270	1,413,124	92,660	4,168.75	24,537.98	40,644

List of vessels passing through canal at the Cascades, Columbia River, Oregon, during fiscal year ending June 30, 1908.

Name.	Character.	Length.	Breadth.	Depth of hold.	Net tonnage.	Times passed through canal during fiscal year.
		Feet.	*Feet.*	*Feet.*		
Agnes	Propeller steamboat	58	14	4.6	21	8
Alberta	do				5	2
Bailey Gatzert	Stern-wheel steamboat	194.3	32.8	8	586	239
Barges						18
Capital City	Stern-wheel steamboat	150.2	32	5	348	198
Chas. R. Spencer	do	152	31.3	5.6	499	164
Dalles City	do	150	30.9	3.2	223	291
Diamond O	do	142.5	28.4	6.6	276	6
Georgie Burton	do	153.5	31.5	6.5	342	91
Geo. W. Simons	Propeller steamboat	81.5	17.5	4.4	47	4
J. N. Teal	Stern-wheel steamboat	160	34.4	5.4	456	154
Lacrosse	Propeller steamboat	49	11	3.5	3	2
Lillian B	do	49	12	4	2	2
Madam	do					1
Maja	do	54.1	12.1	5.4	22	1
Pearl	do	44.7	10.2	3.6	8	1
Resolute	do	52	12.5	5	12	5
Stranger	do	73.6	17.7	6	51	2
Telephone	Stern-wheel steamboat	201.5	31.5	8	589	88
Weown	do	153.5	31.5	6.5	319	70
Total						1,[illegible]

Meteorological and gauge records for fiscal year ending June 30, 1908.

Month.	Rainfall.	Days on which rain or snow fell.	Average maximum temperature, ° F.	Highest readings of gauges.		Lowest readings of gauges.	
				Head of canal.	Foot of canal.	Head of canal.	Foot of canal.
1907.	*Inches.*						
July	0.84	4	83.6	120.0	106.4	111.0	95.7
August	1.80	7	75.1	110.8	95.8	104.0	84.4
September	3.45	8	72.6	101.0	84.4	101.3	83.3
October	1.62	5	66.4	101.2	80.5	98.5	76.0
November	12.53	17	53.0	98.7	77.3	97.7	76.0
December	18.81	24	45.0	100.0	79.4	97.0	74.6
1908.							
January	9.08	17	44.2	97.8	75.9	96.5	73.5
February	5.86	15	45.5	95.4	73.0	95.5	71.7
March	12.39	23	53.0	107.0	89.7	96.5	73.2
April	4.08	10	63.0	111.0	95.8	99.9	76.6
May	4.98	18	60.6	114.6	100.6	109.3	93.6
June	2.22	7	69.5	125.6	112.4	114.6	100.2
Total	77.66	155					

Highest reading at head of canal during the year 125.6
Highest reading at foot of canal during the year 112.4
Lowest reading at head of canal during the year 95.5
Lowest reading at foot of canal during the year 71.7

NOTE.—Reading of adopted low water at head of canal is 96; reading of adopted low water at foot of canal is 72.

V V II.

IMPROVEMENT OF THE COLUMBIA RIVER BETWEEN VANCOUVER, WASHINGTON, AND THE MOUTH OF WILLAMETTE RIVER.

For details of this work, with status of improvement, attention is invited to the summary of this report, and to report of the Board

of Engineers printed in the Annual Report of the Chief of Engineers for 1904, page 3497 et seq.

OPERATIONS DURING THE FISCAL YEAR 1908.

In 1906, 253,415 cubic yards of dredging was necessary to remove the deposit of the previous freshet and restore the channel below the city of Vancouver to a depth of 20 feet and width of 150 feet. The channel shoaled again to 12 feet during the freshet of 1907, but owing to the sinking of the dredge *Portland*, which was relied upon to again do the dredging, the channel could not be restored the last low-water season. The only available dredger, which had a 16-inch suction, was tried in January, and after ten days' experiment was withdrawn by the owners, partly because she was not altogether suitable and partly because a fuel famine just then set in. As nothing effective was done no charge was made for the small amount of work done.

The dike at the head of Hayden Island is in good condition.

The usual survey will be made below Vancouver as soon as the freshet subsides, with a view to doing the necessary dredging under funds now available. The sum of $10,000 will be needed for redredging during the next fiscal year.

Money statement.

July 1, 1907, balance unexpended	$10,527.06
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	540.14
July 1, 1908, balance unexpended	9,986.92
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

July 13, 1892	$33,000	June 13, 1902	$2,000
June 3, 1896	67,000	March 3, 1905	30,000
June 6, 1900 (allotment of June 18, 1901)	8,000	June 30, 1906	13,000
February 2, 1900 (refundment of overpayment)	1	Total	153,001

CONTRACT IN FORCE (FORMAL).

Name of contractor: The port of Portland.
Date of contract: July 31, 1905.
Character: Hire of 20-inch suction dredge.
Amount of work: Indefinite.
Price: One hundred and fifty-five dollars per day.
Approved: August 30, 1905.
Date of beginning: July 31, 1905.
Date of expiration: July 30, 1907.

APPENDIX W W.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SECOND PORTLAND, OREGON, DISTRICT.

REPORT OF LIEUT. COL. S. W. ROESSLER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Willamette River above Portland, Yamhill and Long Tom rivers, Oregon.
2. Operating and care of lock and dam in Yamhill River, Oregon.
3. Columbia and lower Willamette rivers below Portland, Oregon.
4. Mouth of Columbia River, Oregon and Washington.
5. Clatskanie River, Oregon.
6. Cowlitz and Lewis rivers, Washington.
7. Grays River, Washington.
8. Gauging waters of Columbia River, Oregon and Washington.

UNITED STATES ENGINEER OFFICE,
Portland, Oreg., July 9, 1908.

SIR: I have the honor to transmit herewith annual report * * * for the fiscal year ending June 30, 1908, for improvement of Willamette River, and of Columbia River below the mouth of the Willamette River, and their tributaries, Oregon and Washington, in my charge.

Very respectfully, your obedient servant,

S. W. ROESSLER,
Lieut. Col., Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

W W 1.

IMPROVEMENT OF WILLAMETTE RIVER ABOVE PORTLAND, AND YAMHILL RIVER, INCLUDING THE MAINTENANCE OF LONG TOM RIVER, OREGON.

The details of this work, with status of improvement, are given in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

A small dipper dredge was employed to dredge low-water channels through gravel bars at Black Dog, Buds Chute, Gray Eagle, Salem bar, Lamberts, Eldridge, Allison, Candiani, Carys Bend, Yamhill and Ash Island bars. The cuts were made only wide enough to pass the boats, in order not to draw off too much of the pools above. Their average dimensions were 40 feet wide and 3½ to 4 feet deep at low water. The dredged material was dumped along the cut and on the side where it was not likely to be washed back into the channel. These cuts usually require redredging every year. The average monthly cost of the dredge is $900.

The following is a summary of the operations of the dredge:

Gravel dredged	cubic yards	29,472
Gravel removed by shovel and team	do	2,475
Time actual dredging	hours	541
Time moving and repairing	do	258
Distance dredged moved	miles	221
Average monthly cost of operation, about		$900

The snag boat *Mathloma* was in commission nearly the whole year, and besides freeing the channel of snags was used in dredging bars at Eola, Salem, Simons, and Matheneys, using therefor an auxiliary dredging outfit with which she was equipped during the year. She was also employed in towing brush for the revetment and dam at Wheatland.

The following is a summary of the operations of the *Mathloma:*

Snags removed by boat	number	877
Snags removed by blasting	do	19
Trees cut from bank	do	651
Powder used	pounds	505
Wood consumed	cords	494
Distance moved	miles	2,088
Fascines transported	cords	675
Gravel dredged at Wheatland revetment	cubic yards	1,242
Gravel dredged on bars	do	4,501
Average monthly cost of operations		$1,188

The dam and revetment at Wheatland cover a point where a diversion of the river was threatened through an old river bed. Its cost was $17,000. Minor repairs were made to the dam at Matheneys and to the revetment at Independence. An extension of the latter revetment downstream to protect a rapidly caving bank and the construction of a revetment opposite the town of Albany are very desirable—in the former case to keep the bend of the river from assuming a bad shape; in the latter case to prevent a threatened cut-off.

The following is a summary of the work done on repairs to dams and construction of revetment at Independence:

Existing dams repaired and extended	number	1
Piles driven	do	428
Brush fascines cut and placed	cubic yards	1,158
Sacks of gravel placed	number	752
Loose gravel placed	cubic yards	7,296
Earth removed (Independence revetment)	do	5,368
Area repaired (Independence revetment)	square yards	871
Stone placed (Independence revetment)	cubic yards	1,368

Money statement

July 1, 1907, balance unexpended		[illegible]
Refundment of overpayment		[illegible]
		[illegible]
June 30, 1908, amount expended during fiscal year		
For works of improvement	[illegible]	
For maintenance of improvement	[illegible]	
		[illegible]
July 1, 1908, balance unexpended		[illegible]
July 1, 1908, outstanding liabilities		[illegible]
July 1, 1908, balance available		[illegible]
Amount (estimated) required for completion of existing [illegible]		[illegible]
Amount that can be profitably expended in fiscal year [illegible] 1910, in addition to the balance [illegible]		
For works of improvement	[illegible]	
For maintenance of improvement	[illegible]	
		[illegible]
Submitted in compliance with [illegible] of section [illegible] June 4, 1897, and of section 7 of the river and harbor act of [illegible]		

APPROPRIATIONS

March 3, 1871	$16,000.00	August [illegible] 1894 [illegible]	
March 3, 1873	3,000.00	[illegible]	
June 23, 1874	7,500.00	[illegible]	$25,000.00
March 3, 1875	25,000.00	June [illegible] 1896 [illegible]	
August 14, 1876	20,000.00	[illegible]	40,000.00
June 18, 1878	20,000.00	June [illegible] 1897 [illegible] Willamette	
March 3, 1879	12,000.00	[illegible]	100,000.00
June 14, 1880	12,000.00	All [illegible] emergency	
March 3, 1881	15,000.00	[illegible] June 4, 1897	5,000.00
August 2, 1882	5,000.00	June [illegible] 1897	85,000.00
July 5, 1884	10,000.00	April [illegible] 1904 [illegible]	12,000.00
August 5, 1886	10,000.00	March [illegible] 1907	50,000.00
August 11, 1888	20,000.00	March [illegible] 1907	60,000.00
September 19, 1890	11,000.00	Refundment of overpayment	17.45
July 13, 1892 (of which $3,000 was allotted to Yamhill River)	30,000.00	Total	643,517.45

NOTE.—By river and harbor act of March 3, 1899, $3,000 was transferred to and expended on improvement of Long Tom River, Oregon.

COMMERCIAL STATISTICS.

The canal and locks at Oregon City overcoming the falls of the Willamette River are owned and operated by the Portland General Electric Company, and the following is a statement for the year ending December 31, 1907, of the traffic passing through them:

Grain	tons	[illegible]
Flour and mill stuff	do	3,277
Coal	do	3,488
Wool	do	[illegible]
General merchandise	do	[illegible]
Potatoes	do	[illegible]
Hops	do	[illegible]
Paper stock	do	[illegible]
Pulp	do	[illegible]
Paper	do	[illegible]
Piling	do	[illegible]
Lumber	[illegible]	[illegible]
Logs	[illegible]	[illegible]
Cattle and horses	[illegible]	[illegible]
Sheep and hogs	[illegible]	[illegible]
Passengers	[illegible]	[illegible]

The following statement of traffic carried on the Willamette River above Portland was compiled from reports of various steamers and transportation companies doing business thereon during the year ending December 31, 1907:

Article.	Tons.
Wheat	4,705
Other cereals	3,908
Flour	2,719
Piles (121,000 linear feet)	2,420
Lumber (726,046 feet B. M.)	1,210
Shingles (4,000 bundles)	100
Logs (41,062,066 feet B. M.)	68,437
Coal	57
Hay	3,003
Wool	72
Potatoes	2,369
Fish	27
Hops	2,502
Railroad iron, etc	729
Sand and gravel	162,002
Stone	29,564
Wood (5,159 cords)	7,738
Cattle and horses, number, 1,603	641
Sheep and hogs, number, 611	45
Fruit	464
General merchandise	20,373
Oil (225,899 barrels)	37,650
Other articles	62,111
Total	412,846
Passengers carried ..... number	41,998

W W 2.

OPERATING AND CARE OF LOCK AND DAM IN YAMHILL RIVER, OREGON.

OPERATIONS DURING THE FISCAL YEAR 1908.

The lock was opened for navigation from July 1 to November 24, 1907, and from April 21, 1908, to the end of the fiscal year. From November 24, 1907, to April 21, 1908, it was closed to traffic on account of high water sixty days and open eighty-nine days.

The highest water of the year occurred December 28, 1907, and registered 19½ feet above the top of the lock walls. Some damage was caused to the machinery by driftwood during this freshet, which damage was repaired. Repairs were also made to the paving below the dam by grouting a section of about 1,000 square feet, and during the year the lock, dam, adjacent ground, and general property have been cared for and kept in repair.

A separate report was made requesting allotment of $1,800 to provide a fish ladder over the dam as required by the laws of the State of Oregon.

Summary of expenditures made in operating and caring for lock and dam in Yamhill River, Oregon, during the fiscal year ending June 30, 1908, submitted in compliance with river and harbor act of July 5, 1884.

Items of estimate.	Amount expended.
Operating and general care of lock	$1,537.10
Engineering, office expenses, and contingencies	150.00
Total	1,687.10

Money statement.

July 1, 1907, balance unexpended	$2,223.89
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	1,687.10
July 1, 1908, balance unexpended	536.79
July 1, 1908, outstanding liabilities	96.50
July 1, 1908, balance available	440.29
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	1,200.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

ALLOTMENTS.

September 19, 1900	$1,460	July 3, 1905	$1,300
January 18, 1901	1,500	July 10, 1906	1,660
May 24, 1901	23,200	July 6, 1907	1,900
July 12, 1902	2,700		
July 14, 1903	2,300	Total	36,720
June 25, 1904	700		

COMMERCIAL STATISTICS.

Statement showing traffic through lock and dam in Yamhill River, Oregon, during fiscal year ending June 30, 1908.

Date.	Lock open.	Lock closed.	Number lockages.	Time operating.	Freight carried through lock.	Passengers carried.
1907.	*Days.*	*Days.*		*h. m.*	*Tons.*	*Number.*
July	31	.....	4	50	.....	15
August	31	.....	3	39	.....	9
September	30	.....	2	3 30	.....	.....
October	31	.....	4	1 45	7.50	9
November	24	6	5	1 20	.....	13
December	12	19	11	9 11	420.00	.....
1908.						
January	10	21	9	7 40	292.50	.....
February	24	5	1	12	.....	2
March	25	6	2	25	.....	6
April	27	3	5	1 24	151.50	.....
May	31	.....	9	2 47	207.00	8
June	30	.....	25	13 42	942.25	18
Total	306	60	80	43 25	2,020.75	80

The above traffic consisted of cord wood and logs for paper pulp and sand and gravel for McMinnville. In addition to this, 142,000 feet of logs passed over the dam during high-water stage.

W W 3.

IMPROVEMENT OF COLUMBIA AND LOWER WILLAMETTE RIVERS BELOW PORTLAND, OREGON.

For further information relative to the improvement of these streams attention is invited to the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

The original revetment of Coon Island at the mouth of the Willamette River was a brush and stone-pile dike, with two rows of piles. This dike was flanked some years ago, leaving a portion of it in the channel of the river, where it had become a serious obstruction to navigation. Two thousand five hundred and fifteen linear feet of this dike was removed by a large dipper dredge during the year, at a cost of $5,515. The dredging was carried to a depth of 23 to 33 feet at low water.

The stone revetment at Coon Island was extended 380 feet upstream and 80 feet downstream. Cubic yards of rock placed, 4,458; square yards of revetment constructed, 6,910; total cost, $5,484.

The usual low-water surveys after the summer freshet in the Columbia were made at Willow bar, Henrici bar, Martins Bluff bar, and Hunter bar. Channel survey was made between St. Johns and the steel bridge in the Willamette River, Portland Harbor.

The U. S. dredge *W. S. Ladd* worked the entire year in the lower estuary, and removed 472,998 cubic yards of material, at a total expense of $36,303.63. The total cost per cubic yard was $0.0768, of which the coal item alone, which was exceptionally high this year, was $0.0296. The total amount dredged by this boat in this and previous fiscal years is 7,376,802 cubic yards.

The dredges *Columbia* and *Portland*, belonging to the port of Portland commission, were used in dredging the main ship channel from Portland to the mouth of the Willamette River and in the Columbia River at Henrici bar, Hunters bar, Dobelbowers bar, and Slaughters bar. The total amount excavated was 2,012,000 cubic yards, and the total cost was $93,085. As there was no national appropriation available, the expense was borne by the port of Portland commission.

The ruling depth at the end of the fiscal year between Portland and the mouth of the estuary was about 22 feet, with the exception of one point near Astoria, where there was but 20 feet, but where an 8-foot tide can be taken advantage of for passing deep-draft vessels.

The increase in the ruling depth in the main ship channel since the beginning of improvement is about 8 feet.

The variations in water level are 2-foot tide at Portland and 7-foot tide at Astoria. The variations due to freshets in the Columbia range from 21 feet at Portland to zero at Astoria.

The new dredge to replace the *W. S. Ladd*, which is being constructed under contract with the Newport News Shipbuilding and Dry Dock Company, of New York, is nearly completed, and it is expected that she will start on her voyage around the Horn about next October.

Miscellaneous work of repairs to plant were carried on at the Government moorings below Portland, and numerous applications for

permission to erect fish traps and other structures were examined and acted upon.

Money statement.

July 1, 1907, balance unexpended	$387,384.07
Received from sales of blueprints	14.35
	387,398.42
Allotted Philadelphia district for constructing dredge, less $3.20 account sales of blueprints	46,101.80
	341,296.62
June 30, 1908, amount expended during fiscal year for maintenance of improvement	61,095.14
July 1, 1908, balance unexpended	280,201.48
July 1, 1908, outstanding liabilities	2,815.00
July 1, 1908, balance available	277,386.48
Amount (estimated) required for completion of existing project	2,498,509.93
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908 Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	200,000.00

APPROPRIATIONS.

Lower Willamette, act of—	
June 23, 1866	$15,000.00
March 2, 1867	30,000.00
July 25, 1868 (allotted)	21,000.00
April 10, 1869 (allotted)	13,365.00
July 11, 1870	31,000.00
June 10, 1872	50,000.00
	160,365.00
Lower Willamette, from Portland to the sea, act of—	
March 5, 1873	20,000.00
June 23, 1874	20,000.00
March 3, 1875	20,000.00
August 14, 1876	20,000.00
June 18, 1878	30,000.00
March 3, 1879	45,000.00
	155,000.00
Lower Willamette and Columbia, from Portland to sea, including bar at the mouth of Columbia River, act of—	
June 14, 1880	45,000.00
March 3, 1881	45,000.00
August 2, 1882	100,000.00
	190,000.00

Columbia and lower Willamette, below Portland, Oreg., act of—	
July 5, 1884	$100,000.00
August 5, 1886	75,000.00
August 11, 1888	100,000.00
September 19, 1890	100,000.00
July 13, 1892	150,000.00
August 18, 1894	50,000.00
June 3, 1896	100,000.00
March 3, 1899	150,000.00
June 13, 1902	225,000.00
April 28, 1904 (allotted)	15,000.00
March 3, 1905	100,000.00
June 30, 1906	125,000.00
March 2, 1907	300,000.00
	1,590,000.00
Receipts from sales	605.23
Refundments of overpayments	36.11
Total	2,096,006.34

CONTRACTS IN FORCE.

Formal:
Name of contractor: The Port of Portland, Portland, Oreg.
Date of contract: September 4, 1906.
Character: Hire of 30-inch suction dredge.
Amount of work: Indefinite.
Price: $265 per day.
Approved: September 18, 1906.
Date of beginning: September 18, 1906.
Date of expiration: June 30, 1908.

Emergency:
Name of contractor: Geo. W. Sanborn, Astoria, Oreg.
Date of contract: June 20, 1907.
Character: Furnishing and delivering coal.
Quantity: Approximately 2,000 tons.
Prices: $7.75 per ton of 2,240 pounds for "Black Diamond."
$7.60 per ton of 2,240 pounds for "South Prairie."
$7.75 per ton of 2,240 pounds for "Franklin."
Approved: Contract authorized by Chief of Engineers June 7, 1907.
Date of beginning: July 1, 1907.
Date of expiration: June 30, 1908.

Emergency:
Name of contractor: Pacific Bridge Company, Portland, Oreg.
Date of contract: March 21, 1908.
Character: Hire of one dipper dredge and two scows.
Prices: $170 per day for use of dredge.
$5 per day for use of each scow.
Approved: Contract authorized by Chief of Engineers March 20, 1908.
Date of beginning: Ten days after date of contract.
Date of expiration: Thirty days after date of beginning.

COMMERCIAL STATISTICS.

Arrivals and clearances of vessels at Astoria, Oreg., during the year ending December 31, 1907.

[From collector of customs at Astoria, Oreg.]

Vessel.	Coastwise.		Foreign ports.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Arrived	1,382	1 879,044	108	241,911	1,490	2,120,955
Cleared	1,395	1,889,842	12	9,075	1,407	1,898,917
Total	2,777	3,768,886	120	250,986	2,897	4,019,872

Commerce for the year ending December 31, 1907.

Value of exports to foreign countries $329,103.00
Value of imports from foreign countries 21,644.00
Duties collected 6,134.36

Principal article of export was lumber.
Principal articles of import were cement, coal, and Chinese merchandise.

Arrivals and clearances of vessels at Portland, Oreg., during the year ending December 31, 1907.

[From collector of customs at Portland, Oreg.]

Vessels.	Coastwise.		Foreign ports.		Total.	
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Arrived	559	740,275	58	132,696	617	872,971
Cleared	483	530,508	127	318,014	610	848,522
Total	1,042	1,270,783	185	450,710	1,227	1,721,493

Commerce for the year ending December 31, 1907.

Value of exports to foreign countries $15,163,341.00
Value of imports from foreign countries 4,417,115.00
Duties collected 1,201,499.32

Registered tonnage, in and out, over Columbia River bar during year ending December 31, 1907.

	Deep-sea vessels.						Coasters.		Total.	
	American.		British.		Other flags.					
	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.	Number.	Tonnage.
Inward to Astoria and Portland	8	12,558	71	172,518	78	189,775	881	1,079,346	1,038	1,454,192
Outward from Portland and Astoria	10	11,351	61	151,859	69	170,426	842	906,063	982	1,239,699
Total	18	23,904	132	324,377	147	360,201	1,723	1,985,409	2,020	2,693,891

Total freight, foreign and coastwise, carried in and out over the Columbia River bar during the calendar year 1907, 1,664,717 tons.

Statement showing principal articles and tonnage of foreign exports and imports at Portland, Oreg., during the year ending December 31, 1907.

Articles.	Tons.	Articles.	Tons.
EXPORTED.		IMPORTED.	
Wheat	277,128	Bags, jute	3,870
Flour	143,835	Burlap	2,660
Barley	14,918	Cement	76,241
Cotton	270	Coal	60,797
Printing paper	171	Coffee	102
Beef, canned	2	Coke	2,746
Leather	10	Fire brick and clay	5,487
Lumber	229,814	Iron, pig and bar	8,613
Machinery	2,650	Malt liquors	16
		Manila	361
		Other fibers	821
		Matting	460
		Oils	90
		Rice	3,079
		Silk, raw	23
		Spices	739
		Spirits	78
		Sulphur	3,826
		Salt	55
		Tapioca	211
		Tea	766
		Tin in bars	275
		Window glass	20
Total	668,788	Total	171,336

The following is a statement of traffic carried on the Columbia and lower Willamette rivers during the calendar year 1907:

Article.	Tons.
Wheat	15,609
Other cereals	10,776
Flour	16,700
Piles (1,065,145 linear feet)	21,302
Lumber (23,664,331 feet B. M.)	89,441
Shingles (978,452 bundles)	24,461
Logs (664,356,924 feet B. M.)	1,078,928
Coal	16,876
Hay	10,626
Wool	195
Potatoes	38,747
Fish	26,988
Hops	1,804
Railroad iron, etc	7,209
Sand and gravel	261,140
Stone	609,883
Wood (11,725 cords)	17,587
Cattle and horses (number, 16,337)	6,535
Sheep and hogs (number, 32,139)	2,410
Fruit	9,984
General merchandise	122,978
Oil (1,061,818 barrels)	176,970
Other articles	74,820
Handled by river vessels	2,586,964
Handled by seagoing vessels	1,664,717
Total	4,251,681

Passengers carried by river vessels, 347,080.

List of vessels, not including seagoing vessels, plying the Willamette and lower Columbia rivers and their tributaries below Portland, Oreg.; the upper Willamette and Yamhill rivers and their tributaries above Portland, Oreg., during the calendar year 1907.

[Furnished by the inspectors of boilers and hulls at Portland, Oreg.]

Name of vessel.	Net tonnage.	Depth.
		Feet.
Agnes		
Agnes		
Altona	242	4.8
America	67	6.2
Annie Comings	431	5.6
Arago	90	9.0
Bailey Gatzert	444	8.0
Beaver	867	6.5
Capitol City	848	5.0
Cascades	267	5.6
Charles R. Spencer	409	6.0
Cygnet		
Chester	98	3.8
Clara		
City of Eugene	214	4.5
Columbia		
Colwell	11	3.5
Cruiser		
Dalles City	323	8.2
Daniel Kern		
Diamond O	276	6.6
Edith	37	9.5
Electro	30	5.3
El Hurd	26	6.2
Elkader	21	4.0
Elmore	467	4.5
Enterprise	209	4.5
Etna		
F. B. Jones	139	7.0
Florence		
Flyer		
Gen'l. Washington		
Georgie Burton	342	6.5
Geo. H. Mendell	90	7.0
Geo. H. Williams	98	7.8
G. K. Wentworth	285	7.0
Game Cock	658	7.9
Grey Eagle	162	4.7
Harvest Queen	511	9.0
Hassalo	503	8.4
Hazel Weir	44	4.6
Hercules	293	8.5
Hoo-Hoo	16	3.2
Hustler	129	7.0
Ione	213	5.0
Independence		
Inkla	50	3.7
J. N. Teal		
James B. Stephens	16	3.0
J. A. Monroe		
Jessie Harkins	55	4.2
John McCracken	52	8.4
Jordan	61	6.2
Joseph Kellogg	312	7.2
Lexington		
Lillian B.		
Lottie	47	6.8
Lurline	338	6.6
Mathloma	270	4.0
Maja		
Maria	184	5.9
Mayflower	82	6.0
M. F. Hasen		
M. F. Henderson	315	7.5
Mascot	199	5.5
Melville	64	6.9
Metlako	122	4.8
Mistic		
Modoc	354	4.8
Mulnomah	34	4.0
N. R. Lang	381	6.2
Nahcotta	112	6.5
Nestor	31	5.0
No Wonder	235	5.6

List of vessels, not including seagoing vessels, plying the Willamette and lower Columbia rivers and their tributaries below Portland, Oreg.; the upper Willamette and Yamhill rivers and their tributaries above Portland, Oreg., during the calendar year 1907—Continued.

Name of vessel.	Net tonnage.	Depth.
		Feet.
Ocklahama	565	8.3
Oregona	281	5.0
Ottawa	72	5.0
Paloma	112	5.4
Petrel	.....	.....
Pomona	295	6.1
Pronto	72	6.0
Republic	60	5.0
Resolute	12	5.0
R. Miler	56	6.8
Robert T. Lincoln	50	7.0
Rowena	.....	.....
Sacajewea	58	5.6
Samson	189	15.6
Sara Dixon	278	6.0
Spielei	.....	.....
Star	28	5.6
Stranger	51	6.0
Tahoma	154	6.0
Telegraph	213	8.0
Telephone	.....	.....
T. J. Potter	676	11.4
Undine	280	6.6
Vanguard	51	4.8
Victor	27	5.7
Vulcan	219	7.0
Wauna	134	5.2
Wenona	34	6.2
Wenona	51	4.8
Weown	.....	.....
Wilavis	.....	.....
Wm. S. Ladd	700	12.0

W W 4.

IMPROVEMENT OF THE MOUTH OF COLUMBIA RIVER, OREGON AND WASHINGTON.

For further information as to the status of this improvement, attention is invited to the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

The project under which the present extension of the jetty is being prosecuted, as formulated by a Board of Engineers, contemplated an enrockment only 10 feet wide on top and raised up only to the level of low water. The project further contemplated that the trestle should be run out as rapidly as possible, and an apron of small rock placed along the north of it to protect against excessive scour until the higher enrockment which was to follow later on could be placed. This method of construction was followed in 1904–5, with the result that on several occasions the pile trestle was swept away, necessitating reerection at much loss of time and at much expense. In previous reports it has been explained that this loss of trestle was due mainly to the fact that the enrockment from which the lower portions of the piles received their support was not high enough nor wide enough on top to give the trestle as a whole the strength and resisting power required to stand up under the fearful onslaught of the seas. The experience acquired in these earlier years suggested the necessity of

modifying the estimate, so as to provide for a much higher and wider enrockment than originally contemplated. Such estimate was forwarded and approved, and the work in the past year consisted in rerecting the trestle over a portion of the jetty from which it had been swept in the previous year and in building up the enrockment to the level of about mid tide, and for a width on top equal to the width of the trestle, approximately 25 feet.

At the beginning of the fiscal year the end of the trestle stood at a point 26,518 feet from the root of the jetty at Fort Stevens. During the year this trestle was extended a distance of 2,408 feet to a point 29,416 feet from shore. This trestle was built over old enrockment and was placed with some difficulty and with considerable risk to the men on pile driver, owing to the impossibility of getting much penetration for the piles.

The amount of rock placed in the jetty was, in round numbers, 393,000 tons, which sufficed to raise the enrockment to a height of 5 feet above mean low tide between the end of the trestle and shores, and to give the enrockment a width of about 25 feet on top. The effect of this higher and wider enrockment in giving the needed support to the pile trestle was evidenced by the trestle's splendid resistance to the storms of an unusually severe winter, there being practically no injury to the tramway during one of the stormiest winters in the history of this coast. Another encouragement is the fact that piles recently taken up out of this higher and wider enrockment and examined as to the effect of the teredo do not show a trace of a single insect in the parts of the piles recovered. This was contrary to all precedent, as they had been down long enough to have become honeycombed with the teredo in the vicinity of low water. What the real explanation is is not known, but it has been suggested that one possible reason is the fact that the higher and broader enrockment, more or less compacted by an admixture of small stone, forms a complete barrier to the operations of the teredo. Whatever the explanation may be, the result is very encouraging to the maintenance of the trestle two or more years, or even longer, until the jetty has been extended to the requisite length.

The piles used were treated with a covering of burlap and tar to protect them from the ravages of the teredo, but it is doubtful whether this covering is efficient, owing to the fact that much of it is torn off as stone is dumped against them, leaving bare spaces of unprotected wood fiber open to attack. An experiment was also made with 400 creosoted piles. Both the creosote and burlap piles are very costly, and in view of the absence of any trace of the teredo in piles recently taken out of the trestle of the wider enrockment for examination, it is proposed to use unprotected piles in the further extension to be made in the future.

Due to a misplaced switch, the pile driver on April 22, 1908, toppled over the trestle and struck on a portion of the enrockment, becoming a complete wreck. All hands belonging to the pile driver were on board, and the majority of them received more or less severe injuries and all of them a severe shock. Three men died from injuries received, and two others were seriously but not permanently hurt.

With a view to increasing the delivery of rock, 110 new dump cars and 3 new locomotives were provided, and 4 new derricks and a new wharf were erected during the year, with all the necessary auxiliaries.

The usual survey of the bar was made during the month of June, and map is transmitted herewith.

The strict enforcement of the eight-hour law during the past year has resulted in an increase in the cost of placing the rock, and this increase is mainly due to the fact that a more liberal rate of pay is now being paid for the services of the highest efficiency, so as to get as much done as possible in a day. Men are now working very much as if they were working by the job.

The dredge *Chinook* has been anchored at the moorings below Portland the whole year.

Money statement.

July 1, 1907, balance unexpended		$713,804.64
Amount appropriated by sundry civil act approved May 27, 1908		1,450,000.00
Received from sale of blueprints		19.15
		2,163,823.79
June 30, 1908, amount expended during fiscal year, for works of improvement		653,700.73
July 1, 1908, balance unexpended		1,510,123.06
July 1, 1908, outstanding liabilities		183,914.00
July 1, 1908, balance available		1,326,209.06
July 1, 1908, amount covered by uncompleted contracts		999,162.00
Amount (estimated) required for completion of existing project		250,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$250,000.00	
For maintenance of improvement	200,000.00	
		450,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

APPROPRIATIONS.

July 5, 1884	$100,000.00	June 6, 1900	$250,000.00
August 5, 1886	187,500.00	June 13, 1902	500,000.00
August 11, 1888	500,000.00	March 3, 1903	1,000,000.00
February 22, 1890	75,000.00	March 3, 1905	400,000.00
September 19, 1890	475,000.00	April 23, 1906	400,000.00
July 13, 1892	350,000.00	June 30, 1906	300,000.00
August 18, 1894	338,180.00	March 2, 1907	750,244.00
Total	2,025,680.00	May 27, 1908	1,450,000.00
June 3, 1896, transferred to credit of improvement of Columbia River below Tongue Point	50,000.00	Receipts from sales	1,891.34
		Refundments of overpayments	2.00
Balance	1,975,680.00	Total	7,027,817.34

CONTRACTS IN FORCE.

Emergency:

Name of contractor: City Lumber and Box Company, Astoria, Oreg.
Date of contract: April 4, 1907.
Character: Furnishing and delivering lumber.
Quantities, with prices:

	Per M feet B. M.
750 pieces, 12 by 16 inches by 36 feet, rough	$18.50
360 pieces, 12 by 14 inches by 22 feet, rough	17.00
8,500 pieces, 5 by 6 inches by 5 feet 6 inches, S-1-S	16.50
500 pieces, 5 by 6 inches by 12 feet, S-1-S	16.50
750 pieces, 6 by 6 inches by 20 feet, rough	15.50
800 pieces, 3 by 12 inches by 16 feet, rough	15.50
200 pieces, 2 by 12 inches by 18 feet, rough	15.50
27,000 feet B. M., 1 by 8 inches, rough	16.50

Approved: Contract authorized by Chief of Engineers March 20, 1907.
Date of beginning: On or before April 30, 1907.
Date of expiration: July 31, 1907.

Name of contractor: Gorman & Brewster, Stella, Wash.
Date of contract: April 17, 1907.
Character: Furnishing and delivering pile timber.
Quantities, with prices:

	Cents per linear foot.
240 sticks, each from 50 to 55 feet long	13½
97 sticks, each from 70 to 75 feet long	13½
133 sticks, each from 76 to 80 feet long	14
21 sticks, each from 81 to 85 feet long	14
13 sticks, each from 86 to 90 feet long	14

Approved: Contract authorized by Chief of Engineers March 29, 1907.
Date of beginning and expiration: All pile timber to be delivered within seventy-five days from date of contract.

Name of contractor. Tatum & Bowen, Portland, Oreg.
Date of contract: May 8, 1907.
Character: Furnishing and delivering hoisting engines.
Quantity: Two.
Price: $2,100 each.
Approved: Approval not required.
Date of beginning and expiration: Both engines to be delivered within ninety days from date of contract.

Name of contractor: Geo. W. Sanborn, Astoria, Oreg.
Date of contract: June 20, 1907.
Character: Furnishing and delivering coal.
Quantity: Approximately 4,200 tons.
Prices:
$7.65 per ton of 2,240 pounds for "Black Diamond."
$7.50 per ton of 2,240 pounds for "South Prairie."
$7.65 per ton of 2,240 pounds for "Franklin."
Approved: Contract authorized by Chief of Engineers June 7, 1907.
Date of beginning: July 1, 1907.
Date of expiration: June 30, 1908.

Name of contractor: Lebeck & Co., Astoria, Oreg.
Date of contract: October 4, 1907.
Character: Driving, capping, and bracing piling.
Approximate quantities, with prices:
34,335 linear feet piling, at 22 cents per linear foot.
56,548 feet B. M. lumber, at $34 per M feet B. M.
Approved: Contract authorized by Chief of Engineers August 5, 1907.
Date of beginning: Ten days after signature to contract.
Date of expiration: Ninety days after date of contract.
Extension: Time for completion was extended a reasonable period.

Name of contractor: M. Gorman, Stella, Wash.
Date of contract: November 8, 1907.
Character: Furnishing and delivering pile timber.

Quantities, with prices:	Cents per linear foot.
200 sticks, 90 to 95 feet long	17½
400 sticks, 96 to 100 feet long	17½
60 sticks, 120 to 125 feet long	20½

Approved: Contract authorized by Chief of Engineers October 12, 1907.
Date of beginning: Thirty days after signature to contract.
Date of expiration: February 1, 1908.

Formal:
Name of contractor: Columbia Contract Company, Portland, Oreg.
Date of contract: July 13, 1907.
Character: Furnishing and delivering stone.
Quantities and prices:
200,000 tons foundation stone, at $1.10 per ton of 2,000 pounds.
1,000,000 tons jetty stone, at $1.12 per ton of 2,000 pounds.
Approved: September 5, 1907.
Date of beginning: Ten days after date of notification of approval of contract.
Date of expiration: Beginning with working season of 1908, foundation stone to be delivered at rate of approximately 1,000 tons per working day and jetty stone at rate of approximately 1,500 tons per working day for first thirty days after date of notification of approval of contract, and at rate of approximately 3,000 tons per working day thereafter until contract has been completed.

Name of contractor: Willamette Iron and Steel Works, Portland, Oreg.
Date of contract: December 27, 1907.
Character: Furnishing and delivering hoisting engines.
Quantity: Four engines.
Price: $1,350 each.
Approved: January 23, 1908.
Date of beginning and expiration: All engines to be shipped from Portland, Oreg., within ninety days after date of notification of approval of contract.

Name of contractor: The Caldwell Brothers Company, Seattle, Wash.
Date of contract: December 27, 1907.
Character: Furnishing and delivering boilers.
Quantity: Two.
Price: $1,374 each.
Approved: January 24, 1908.
Date of beginning and expiration: Boilers to be shipped from Erie, Pa., within fifteen days after date of notification of approval of contract.

Name of contractor: Davenport Locomotive Works, Davenport, Iowa.
Date of contract: December 27, 1907.
Character: Furnishing and delivering locomotives.
Quantity: Three.
Price: $3,032.50.
Approved: January 31, 1908.
Date of beginning and expiration: All locomotives to be shipped from Davenport, Iowa, within thirty days after date of notification of approval of contract.

W W 5.

IMPROVEMENT OF CLATSKANIE RIVER, OREGON.

For details of this work, with status of improvement, see summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

The only work done during the year was the snagging of the channel between the town of Clatskanie and the mouth, also in dredg-

ing below the town of Clatskanie. Dipper dredge *No. 2* was engaged on this work from November 4 to November 22, and the dredging left a channel with a least depth of 2½ feet from the mouth to Clatskanie. A total of 5,200 cubic yards of material was removed from the channel and placed on the banks.

It is believed that a small amount of dredging may again be necessary to maintain the improvement, and the amount named as a profitable expenditure, added to the balance available, will be applied to that purpose.

Money statement.

July 1, 1907, balance unexpended	$912.53
June 30, 1908, amount expended during fiscal year for maintenance of improvement	588.00
July 1, 1908, balance unexpended	324.53
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	500.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATION.

March 3, 1899 ..... $13,000

COMMERCIAL STATISTICS.

The following statement of traffic carried on the Clatskanie River was compiled from reports of various steamers and transportation companies doing business thereon during the year ending December 31, 1907:

Article.	Tons.	Article.	Tons.
Wheat	90	Hops	4
Other cereals	554	Sand and gravel	952
Flour	158	Cattle and horses (number, 248)	99
Lumber (298,000 feet B. M.)	497	Fruit	12
Shingles (71,168 bundles)	1,779	General merchandise	1,230
Logs (10,386,099 feet B. M.)	17,310	Other articles	50
Coal	22		
Hay	100	Total	22,925
Potatoes	68		

Passengers carried by river vessels, 502.

W W 6.

IMPROVEMENT OF COWLITZ AND LEWIS RIVERS, WASHINGTON.

For details of this work, with status of improvement, see summary of this report.

(A) OPERATIONS DURING FISCAL YEAR 1908 FOR COWLITZ RIVER, WASHINGTON.

During the fiscal year the obstructing logs and snags were removed from the river as far up as Toledo, partly on Government force ac-

count and partly by the Kellogg Transportation Company, the United States furnishing the powder.

Johnson Ferry bar was increased by dredging from 1½ to 3 feet, Clarks bar from 2 to 5 feet, Chiholitz bar to a depth of 4 feet, Castlerock bar to a depth of 4 feet at low water.

A combination sill and revetment 1,150 feet long was constructed across a threatened cut-off at Castlerock, where the extreme freshets of the previous winter had excavated a channel across a neck of land. This is in good condition and is believed to have accomplished its purpose.

It is estimated that in addition to the balance available, the sum of $5,000 will be required for snagging and dredging in the Cowlitz River to the end of the fiscal year 1910.

Money statement.

July 1, 1907, balance unexpended	$12,891.75
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	11,470.08
July 1, 1908, balance unexpended	1,421.67
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	5,000.00

APPROPRIATIONS.

June 14, 1880	$2,000	August 18, 1894	$3,000
March 3, 1881	1,000	June 3, 1896	3,000
August 2, 1882	1,000	March 3, 1899	3,000
July 5, 1884	2,000	June 13, 1902 (allotted)	4,750
August 5, 1886	2,000	March 3, 1905 (allotted)	4,400
August 11, 1888	3,000	March 2, 1907 (allotted)	12,500
September 19, 1890	8,000		
June 13, 1892	3,000	Total	52,650

CONTRACT IN FORCE.

Emergency:

Name of contractor: Burcham & Byrnes Construction and Contracting Company, Kelso, Wash.

Date of contract: July 15, 1907.

Character: Furnishing and delivering rock.

Quantity: Approximately 1,800 cubic yards.

Price: $2.60 per cubic yard.

Approved: Approval not required.

Date of beginning and expiration: Deliveries to commence within ten days after signature to contract, and be continued at rate of 30 cubic yards per working-day until completion.

COMMERCIAL STATISTICS.

The following statement of traffic carried on the Cowlitz River was compiled from reports of various steamers and transportation companies doing business thereon during the year ending December 31, 1907:

Articles.	Tons.	Articles.	Tons.
Piles (536,325 linear feet)	10,726	Stone	2,000
Lumber (8,102,743 feet B. M.)	13,505	Wood (500 cords)	750
Shingles (550,000 bundles)	13,750	Cattle and horses (number, 372)	148
Logs (99,156,192 feet B. M.)	110,260	Sheep and hogs (number, 1,080)	81
Hay	1,050	Fruit	74
Potatoes	1,250	General merchandise	14,210
Fish	380	Other articles	5,600
Hops	1,800		
Railroad iron, etc	500	Total	176,684
Sand and gravel	600		

Passengers carried, 759.

(A) OPERATIONS DURING THE FISCAL YEAR 1908 FOR LEWIS RIVER, WASHINGTON.

The snag boat *Mathloma* was employed during the month of February in removing snags from the channel as far up as Hayes Bend on the North Fork.

It is estimated that the sum of $2,500 can be profitably used during the next two years in dredging and snagging.

Money statement.

July 1, 1907, balance unexpended	$4,574.93
June 30, 1908, amount expended during fiscal year for maintenance of improvement	1,284.51
July 1, 1908, balance unexpended	3,290.42
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	2,500.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

Act of March 3, 1899	$10,000	March 2, 1907 (allotted)	$2,500
June 13, 1902 (allotted)	4,750		
March 3, 1905 (allotted)	5,600	Total	22,850

COMMERCIAL STATISTICS.

The following statement of traffic carried on the Lewis River was compiled from reports of various steamers and transportation companies doing business thereon during the year ending December 31, 1907:

Articles.	Tons.	Articles.	Tons.
Wheat	2,070	Fish	203
Piles (45,425 linear feet)	908	Cattle and horses (number, 1,773)	709
Lumber (123,000 feet B. M.)	205	Sheep and hogs (number, 1,714)	128
Logs (10,439,424 feet B. M.)	17,399	Fruit	3,321
Hay	1,217	General merchandise	6,551
Wool	45		
Potatoes	4,783	Total	37,539

Passengers carried, 13,869.

W W 7.

IMPROVEMENT OF GRAYS RIVER, WASHINGTON.

Grays River is a tributary of the Columbia, emptying into Grays Bay on the Washington side nearly opposite Astoria, Oreg., and further details as to the existing conditions will be found in the summary of this report.

OPERATIONS DURING THE FISCAL YEAR 1908.

No plant was available for doing the work on Grays River until December, when the snag boat *Mathloma*, belonging to the improvement of the Willamette and Yamhill rivers, was sent from Portland, arriving at Grays River on December 5, operations being carried on until the end of that month. The work of snagging was considerably interfered with on account of stormy weather and freshets in the stream. There were removed from the channel 51 snags and trees, most of which were very large and hard to handle. Two hundred and ninety-five trees were also cut from the banks at places where there was danger of the banks caving and the trees blocking the channel.

The work done cleared the channel of the most troublesome snags, but on account of the frequent freshets it is believed that snagging operations will again be necessary, and it is proposed to expend the available balance for that purpose.

Money statement.

July 1, 1907, balance unexpended	$2,500.00
June 30, 1908, amount expended during fiscal year for works of improvement	1,113.30
July 1, 1908, balance unexpended	1,386.70

APPROPRIATIONS.

March 2, 1907	$2,500

W W 8.

GAUGING WATERS OF COLUMBIA RIVER, OREGON.

OPERATIONS DURING THE FISCAL YEAR 1908.

A self-registering tide gauge at Fort Stevens, Oreg., has been kept in operation during the fiscal year, and daily bulletins of the gauge readings have been exhibited for the information of persons interested in navigation of the Columbia River.

A tide gauge was also established in the Columbia River, near the mouth of the Willamette, and daily record of the readings kept.

In view of the importance of these gauge readings as a benefit to pilots and others, the keeping of the records is considered a worthy object.

The amount expended during the year was for the hire of gauge keepers.

Money statement.

July 1, 1907, balance unexpended	$1,613.40
June 30, 1908, amount expended during fiscal year for maintenance of improvement	143.34
July 1, 1908, balance unexpended	1,470.06
July 1, 1908, outstanding liabilities	10.00
July 1, 1908, balance available	1,460.06
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	1,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

August 2, 1882	$500	March 3, 1899	$1,000
July 5, 1884	1,000	June 13, 1902	1,000
August 5, 1886	1,000	March 3, 1905	1,000
August 11, 1888	2,500		
August 18, 1894	1,000	Total	10,000
June 3, 1896	1,000		

APPENDIX X X.

IMPROVEMENT OF RIVERS AND HARBORS IN THE SEATTLE, WASHINGTON, DISTRICT.

REPORT OF MAJ. H. M. CHITTENDEN, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Willapa River and Harbor, Washington.
2. Grays Harbor and bar entrance, Washington.
3. Grays Harbor, inner portion, between Aberdeen and the entrance to said harbor and Chehalis River, Washington.
4. Puget Sound and its tributary waters, Washington.
5. Inspection of fish traps, etc., Puget Sound, Washington.
6. Harbor at Olympia, Washington.
7. Tacoma Harbor, Washington.
8. Waterway connecting Puget Sound with lakes Union and Washington, Washington.
9. Everett Harbor, Washington.
10. Swinomish Slough, Washington.
11. New Whatcom (Bellingham) Harbor, Washington.
12. Improving Columbia River between Wenatchee and Bridgeport, Washington.
13. Okanogan and Pend Oreille rivers, Washington.

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., July 1, 1908.

SIR: I have the honor to forward herewith * * * annual * * * reports of the river and harbor works in my charge for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

H. M. CHITTENDEN,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

X X I.

IMPROVEMENT OF WILLAPA RIVER AND HARBOR, WASHINGTON.

The work of the past year has consisted of dredging a channel 150 feet wide and 12 feet deep at mean lower low water through the two shoals between South Bend and Raymond, under an appropriation of $25,000 in the act of March 2, 1907. The previous low-water depth over these shoals was 12 feet. A contract for this work was

let August 15, 1907, to the North American Dredging Company, at 26 cents per cubic yard. Operations began October 16, 1907, and closed February 29, 1908. A total of 83,400 cubic yards of material was removed, resulting in the improvement contemplated. The new channels have been buoyed and the essential data pertaining thereto furnished to the light-house department and the United States Coast and Geodetic Survey. Maps have been furnished shippers using the channels. The improvement will be of immediate practicable value.

Money statement.

July 1, 1907, balance unexpended	$25,179.44
July 1, 1907, received from sales	.50
	25,179.94
June 30, 1908, amount expended during fiscal year for works of improvement	24,668.08
July 1, 1908, balance unexpended	511.86
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	5,000.00

CONTRACTS IN FORCE.

Contractor: North American Dredging Company.
Date of contract: August 15, 1907.
Date of approval: September 9, 1907.
Date of commencement: November 15, 1907.
Date of completion: January 16, 1908.
Date of completion: Extended to February 29, 1908.
Contract completed: February 29, 1908.

APPROPRIATIONS.

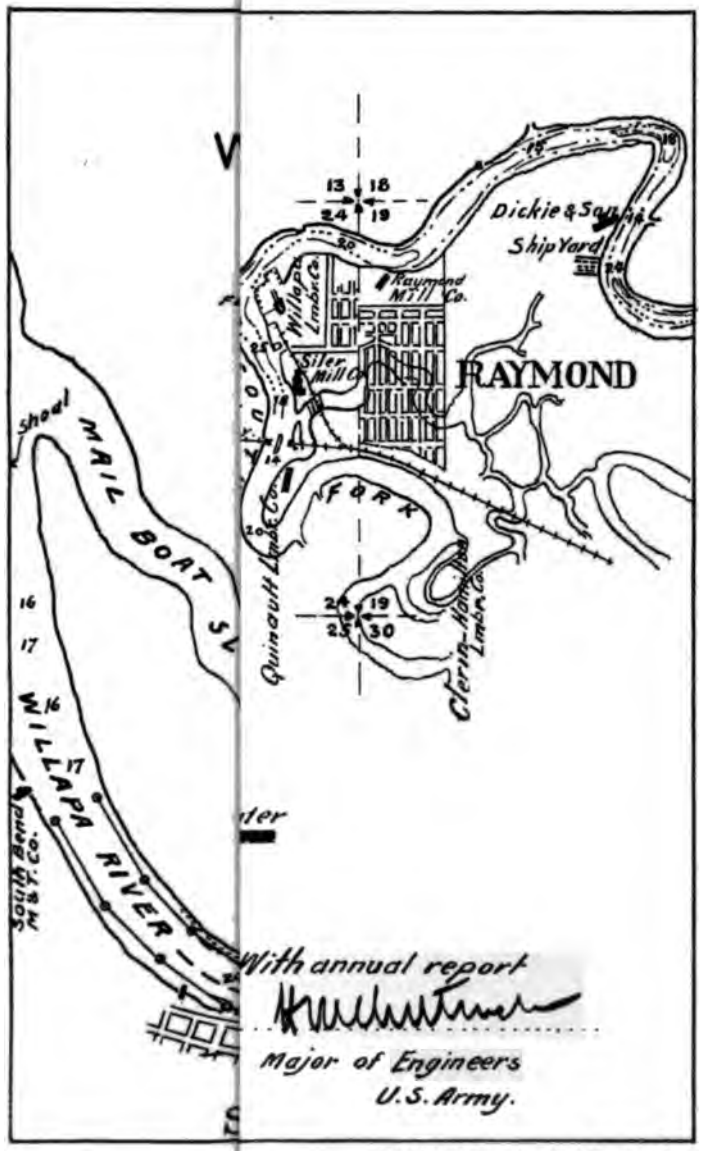
July 13, 1892	$18,000.00
August 19, 1894	13,350.00
March 3, 1899	5,000.00
March 2, 1907	25,000.00
Received from sales	.50
Total	61,350.50

COMMERCIAL STATISTICS.

Shipping.

	Arrivals.	Departures.
Steam vessels	122	122
Sail vessels	53	53
Total	175	175

Maximum draft, 21½ feet.



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Exports and imports.

[Except local traffic.]

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Brick	.....	.....	200	$25,000
Hardware, etc	.....	.....	100	100,000
Lumber and products	180,000	$1,559,000	.....	.....
Miscellaneous merchandise	41	310	1,055	105,500
Oysters and fish	205	11,000	.....	.....
Ship building material	500	40,000	.....	.....
Telephone poles	1,700	7,000	.....	.....
Total	182,446	1,617,310	1,355	230,500

Local traffic.

Articles.	Quantity.	Value.
	Tons.	
Fish and oysters	3,449	$99,635
Flour, feed, etc	415	13,000
Fruit and vegetables	100	3,000
Gravel and sand	10,000	25,000
Miscellaneous merchandise	1,000	100,000
Lumber	100	1,000
Total	15,085	241,635

One hundred and fifty million feet B. M. of saw logs, valued at $1,390,000, were towed on Willapa River during the year.

X X 2.

IMPROVEMENT OF GRAYS HARBOR AND BAR ENTRANCE, WASHINGTON.

No work was done at the south jetty during the year.

A contract for the wharf, trestle, approach, and other structures pertaining to the construction of the north jetty authorized by act of Congress of March 2, 1907, was let September 19, 1907. Work began October 24, 1907, and was completed March 31, 1908.

A contract for furnishing stone was let March 28, 1908, and delivery began June 8, 1908. Owing to delay of the contractors in commencing this work, it was necessary to purchase in open market about 12,000 tons of rock for beginning the work.

Piles, brush, poles, and lumber for the construction of the trestle have been purchased in open market or under emergency contracts.

Actual construction of the jetty was begun May 20, 1908, and had been carried 2,624 feet beyond high water line at the close of the fiscal year.

The following extracts from report of Mr. J. M. Clapp, assistant engineer, describe the operations of the year:

During the winter of 1907–8, from some cause or other, the main channel leading out to sea from the harbor straightened and deepened and the flanking spits and beaches were shallowed. Unusually high run-ins and low run-outs of

tide undoubtedly aided other causes in providing a channel of remarkable depth across the bar. For a time this depth remained at about 24 feet at mean lower low water, or from 32 to 35 feet at high tide. At the present time the high tide depth is from 27 to 30 feet over the bar.

The low water line of the ocean on the north side has shifted seaward fully 1,000 feet since September, 1907, and the long shore channel then flowing westward and northward has shallowed to 18 feet and divided, part of it taking a course almost due westward and flowing into a basin between the north spit and the rim of the bar, from whence it finds its way over the bar in a generally dissipated debouche.

It is the present programme to rapidly extend this north jetty during the present working season, to place the foundation work, and to raise the enrockment work slightly above low tide elevation, thereby taking advantage of the present shallow condition along the site of the jetty and to hold the channel in its present location over the bar and at about the depth now prevailing.

The river and harbor act approved March 2, 1907, appropriated $200,000 for the starting of this work, and authorized the letting of contracts and purchase of material not to exceed in the aggregate $600,000.

Arrangements were made with Mr. A. O. Damon for the purchase of the necessary right of way and this was paid for by the lumber manufacturing plants and banks on Grays Harbor, the cost being $2,600. The deeds and abstract were submitted to the Attorney-General's Department, were approved, and the deed filed for record.

During the late summer of 1907 plans for a wharf and trestle were perfected in the Seattle office, and on September 19, 1907, a formal contract was entered into with the Grays Harbor Construction Company, of Hoquiam, Wash., for its construction.

On March 31, 1908, this company completed its contract and had constructed besides the wharf a trestle approach 5,400 feet long across the point of land separating the bay from the ocean, 900 feet of which was constructed beyond the ocean high-water line.

During the time the contractor was operating, a small force of men were employed by the Government in constructing mess, quarters, store, and office buildings, rebuilding a hydraulic pile driver and installing a fresh water supply system.

A contract was entered into with Daniel Kern for 46 rock dump cars, at a cost of $400 each, delivered at Point Brown, and these were received at the works on March 20, 1908, at which date also a second-hand locomotive was received on trial, and if satisfactory to be purchased and used as a pile-driver tender.

The derrick system was rigged and everything made ready for receiving stone for the jetty construction on May 18, 1908.

On March 4, 1908, a raft of 100 piles was received at the works, and on April 7 a supply of brush fascines was received and stored at the grillages.

On April 25, 900 grillage poles were received and stored at the works, and on this date material of every nature was on hand ready to advance the trestle and foundation construction.

On March 28, 1908, a formal contract w[illegible]ntered into with the Independent Asphalt Company and the Northwestern [illegible]ract Company to supply stone for the work delivered on barges alongside the [illegible]overnment wharf at Point Brown for $1.55 per ton. One quarry named was [illegible]cated on Waldron Island, one of the San Juan archipelago, distant 225 miles by water from the site of the work. Another quarry was located on Port Orchard Bay on Puget Sound, and was about the same distance from the work. The first-named quarry was a sandstone formation, the latter a hard, basalt formation.

Subsequent to entering into this contract the contracting company was able to obtain from the railway company a satisfactory rail rate from quarries of a basaltic nature, located along the line of the railway, and have obtained permission in accordance with the contract to make some deliveries from these sources.

Delivery of stone under this contract was to begin on May 18, 1908, but due to causes unknown to this office the work of developing the quarries was retarded and delivery was delayed until June 7, on which date about 500 tons were taken to the jetty wharf loaded on a flat barge. The [illegible]al unpreparedness on the part of the stone contractor made it necessary t[illegible]e advantage of a clause in the contract and arrangements were made to p[illegible]rchase in open market about 12,000 tons of stone from the Columbia Contr[illegible]t Company, of Portland, Oreg., who is furnishing the stone for the Columbia River jetty.

This was made possible by consent of Colonel Roessler, Corps of Engineers, in charge of that work, who would not require the maximum delivery of stone until about the first of July.

The first stone under this purchase was delivered on June 2, 1908, when a barge of about 1,500 tons arrived.

Meantime the contractor is developing two quarries, one at Oakville and one at McCormick, Wash., along the line of the Northern Pacific Railway, and has not progressed far enough at this time for it to be made certain that stone from these sources will be acceptable.

On May 20 the hydraulic pile driver was removed to the ocean end of the trestle and the work of advancing the trestle started. During the forty days this has been in operation the trestle has been advanced 1,568 feet, the end now being 2,624 feet from the ocean high-water line.

The foundation mattresses have been laid and securely weighted with stone for a distance of 2,176 feet.

The enrockment has been raised to and above midtide for a distance of 1,700 feet.

The daily average advance of the trestle has been 45½ feet. This, it is expected, will be increased after the workmen become more familiar with their duties, the organization at this time being new.

The daily average advance of the foundation work has been 48 feet and is sufficient to admit of rock delivery to the full maximum rate provided for under the contract.

At the close of the year material had been received in following quantities:

Stone from Columbia River, open-market purchase, 2,866.158 tons, at $1.55	$4,442.54
Stone under formal contract, 3,384 tons, at $1.55	5,245.20
2,950 grillage poles, at 27 cents each	796.50
601 cords of brush fascines, at $2.50 per cord	1,502.50
868 cords of brush fascines, at $3 per cord	2,604.00
8,180 linear feet of piles, at 13 cents per linear foot	1,063.40

It is expected that the trestle will have advanced approximately 6,000 feet before the suspension of operations will be necessary this winter, and that throughout this whole length a foundation of brush fascines will be laid, having a width of 30 feet and a thickness of about 3 feet, and that the whole will be securely weighted with stone. That a portion of this length will have the enrockment carried up to the midtide height, thereby completing the work in accordance with the plan for that distance.

A channel known locally as Seal Channel separates the north headline from the north spit and soundings taken along the proposed site of the jetty give a a maximum depth of 18 feet at mean lower low tide; the width of this channel is about 1,400 feet. In advance of this channel the north spit shows bare for a distance of about 800 feet to the low-water line of the bay lying between the north spit and the bar.

It is expected that the jetty construction will reach the north spit by the 1st of August; that the foundation work will closely follow the trestle construction, and that the enrockment work will be carried some distance landward from the foundation work, thus lessening the scour around the end of the trestle as it advances, due to a cutting off of the tides where the enrockment work follows closely the trestle and foundation construction. The work is too young yet to note any improvement just at this time.

Money statement.

July 1, 1907, balance unexpended	$223,224.36
Amount appropriated by sundry civil act approved May 27, 1908	300,000.00
	523,224.36
June 30, 1908, amount expended during fiscal year, for works of improvement	92,302.75
July 1, 1908, balance unexpended	430,921.61
July 1, 1908, outstanding liabilities	16,529.21
July 1, 1908, balance available	414,392.40

July 1, 1908, amount covered by uncompleted contracts	$414,056.75
Amount (estimated) required for completion of existing project	100,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908	100,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

CONTRACTS IN FORCE.

FOR FURNISHING DUMP CARS.

Contractor: Daniel Kern.
Date of contract: November 30, 1907.
Date of commencement: November 30, 1907.
Date of completion: March 15, 1908.

CONSTRUCTION OF WHARF AND TRESTLE.

Contractor: Grays Harbor Construction Company.
Date of contract: September 19, 1907.
Date of approval: October 8, 1907.
Date of commencement: October 24, 1907.
Date of completion: February 24, 1908.
Date of completion: Extended to March 31, 1908.
Contract completed: March 31, 1908.

FOR FURNISHING ROCK.

Contractor: Independent Asphalt Paving Company and Northwestern Contract Company.
Date of contract: March 28, 1908.
Date of approval: May 5, 1908.
Date of commencement: May 18, 1908.
Date of completion: Indefinite.

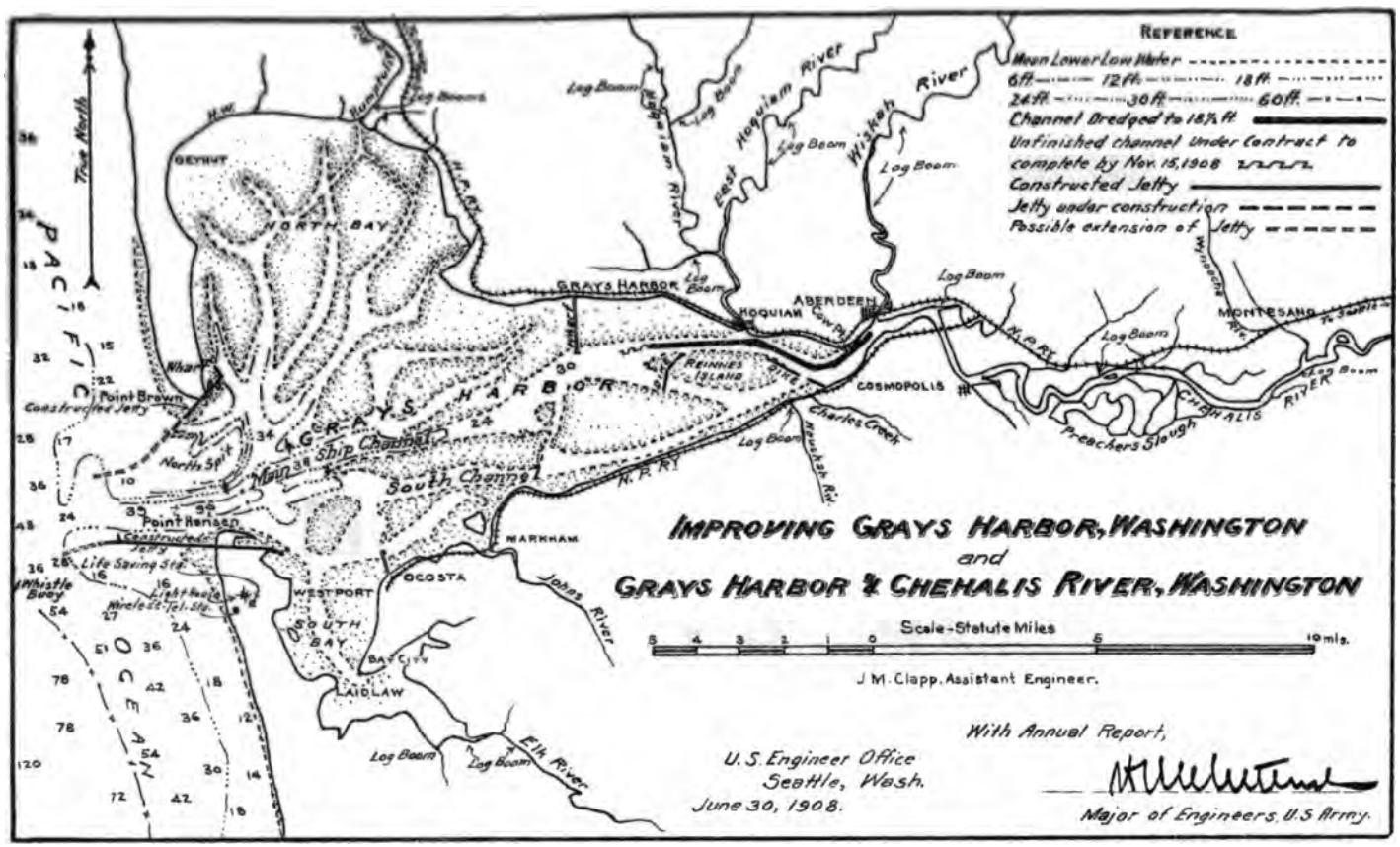
FOR FURNISHING PILING AND BRUSH FASCINES.

[Emergency contract.]

Contractor: R. J. Stoner.
Date of contract: May 14, 1908.
Date of commencement: May 25, 1908.
Date of completion: Indefinite.

APPROPRIATIONS.

June 3, 1896	$20,000.00	March 2, 1907	$200,000.00
June 4, 1897	350,000.00	May 27, 1908	300,000.00
March 3, 1899	285,000.00		
June 6, 1900	50,000.00		1,530,000.00
March 3, 1901	138,225.00	Received from sales	3.60
June 28, 1902	156,775.00		
March 3, 1905	30,000.00	Total	1,530,003.60



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COMMERCIAL STATISTICS.

Shipping.

	Arrivals.	Departures.
Steam vessels	562	563
Sail vessels	272	272
Total	834	835

Total gross tonnage	465,268
Number of passengers carried	5,607

Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Coal and iron			2,129	$99,000
Flour, feed, etc			490	18,150
Fruit and vegetables			1,412	37,000
Hides and tallow	340	$40,800		
Lumber and products	736,918	7,859,035		
Machinery			512	110,490
Miscellaneous merchandise	620	62,000	5,304	636,212
Total	737,878	7,961,835	9,847	900,852

X X 3.

IMPROVEMENT OF GRAYS HARBOR, INNER PORTION, BETWEEN ABERDEEN AND THE ENTRANCE TO SAID HARBOR, AND CHEHALIS RIVER, WASHINGTON.

The following extract from the report of Mr. J. M. Clapp, assistant engineer, describes the operations for the year:

In September, October, and November, 1907, a thorough survey of that part of the river between Aberdeen and Grays Harbor City was made. Cross-sections were made at every 50 feet of the channel its entire distance of 5 miles.

From these new data a map was prepared and the channel to be dredged accurately located, advantage being taken to include the deeper portions within the channel's limits.

Bids were called for on July 12, 1907, for doing the work under the new appropriation, which contemplated the removal of 1,250,000 cubic yards, if the price were within the estimate.

The lowest bid was that of the North American Dredging Company, the price being 15½ cents per cubic yard, place measurement, and on August 8, 1907, a contract was entered into with this company to do the work.

Upon computing the quantities for the excavation of this channel it was found that the funds would not admit of a channel 200 feet wide on the bottom, side slopes of 1 on 2, and to a depth of 18 feet being dredged at the price bid, and that considerable shoaling had taken place. An increased yardage was also included by a specification requiring the contractor to be allowed payment for 1 foot over depth.

A modification in the channel's dimensions was therefore necessary.

The work to be done was located at two points—one above the mouth of the Hoquiam River known as Cow Point bar, and the other below the Hoquiam River known as the lower shoal. The final adjustment of the channel dimensions admitted of a continuous channel being excavated the full length of the shoals.

At Cow Point bar it was to be 175 feet wide on the bottom, 17½ feet deep at mean lower low water, with side slopes 1 on 2; and 160 feet wide on the bottom with side slopes 1 on 2 and to a depth of 17½ feet at mean lower low water through the lower shoal; the contractor, in both cases, to be paid for an overdepth of 1 foot should it be carried below 17½ feet, this to be determined from surveys of the dredged channel.

THE WORK DONE TO JUNE 30, 1908.

A channel has been excavated through Cow Point bar, which has a least width of 185 feet on the bottom and a least depth of 18½ feet. In many places the width is as great as 200 feet and the depth as great as 23 feet, the contractor preferring to cut generously wide and deep to running the risk of a clean up by hewing too close to the line. The total length of the channel through the Cow Point bar is 15,700 feet. The total length of dredged channel when it will have been completed below the mouth of the Hoquiam River is 15,400 feet. Of this length 10,000 feet has been excavated, and soundings show that the channel obtained exceeded the required width of 160 feet, and the depths are everywhere greater than 18½ feet.

The total amount of material to be removed from these two shoals under this contract is 1,200,000 yards. Of this amount 900,000 cubic yards have been removed, leaving a balance of 300,000 cubic yards to excavate, and this, it is estimated, will require the contractor until about September 1 to complete.

MATERIAL REMOVED.

At Cow Point bar the material removed was of three distinct classes.

At the upper end, for a distance of 2,200 feet, it consisted of coarse, clean river sand, intermixed with some forest trash. Immediately west of this and extending a distance of 1,700 feet coarse gravel was encountered, and immediately west of this gravel patch a bank of clay of various colors, from stiff blue clay to granular white, was met. This extended for a distance of 3,350 feet, when suddenly it disappeared and clean river sand reappeared, since which time no other material has been met.

On the whole, a comparatively small amount of trash has been met with, the principal being at the upstream slope of the Cow Point bar; where the limbs of the big trees drifting down stream were driven into the bottom and broken off.

All material dredged was dumped on the adjacent tide flats at a distance of 700 to 1,200 feet from the channel and from 300 to 1,000 feet from the pierhead line, and was so deposited that the currents of the river would not wash it back into the channel again. None of the material excavated was moved from the place of deposit.

Upon completion of the Cow Point channel the Light-House Establishment placed several buoys to mark the channel, and this has resulted in navigators being able to follow the channel with heavily laden vessels without difficulty.

Advantage was taken of the dredging operations by several persons to have certain filling done, and these persons provided bulkheads, behind which the material was deposited.

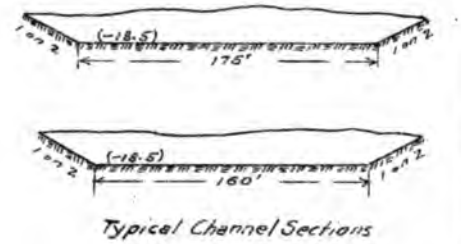
When the dredging will have been completed all the way through to Grays Harbor City, there will be provided a channel through the lower shoal, where the courses are practically straight and long, of a least width of 160 feet, and of a least depth of 18½ feet, and at the Cow Point bar, where the channel is made up of 3 or 4 distinct short courses, a channel of a least width of 175 feet and a least depth of 18½ feet.

Where one course meets another the channel has been widened out by cutting off the inner angle for a distance of 600 feet upstream and downstream from the apex of the inner channel boundary, which enables vessels to move freely and without fear of grounding in making the turn.

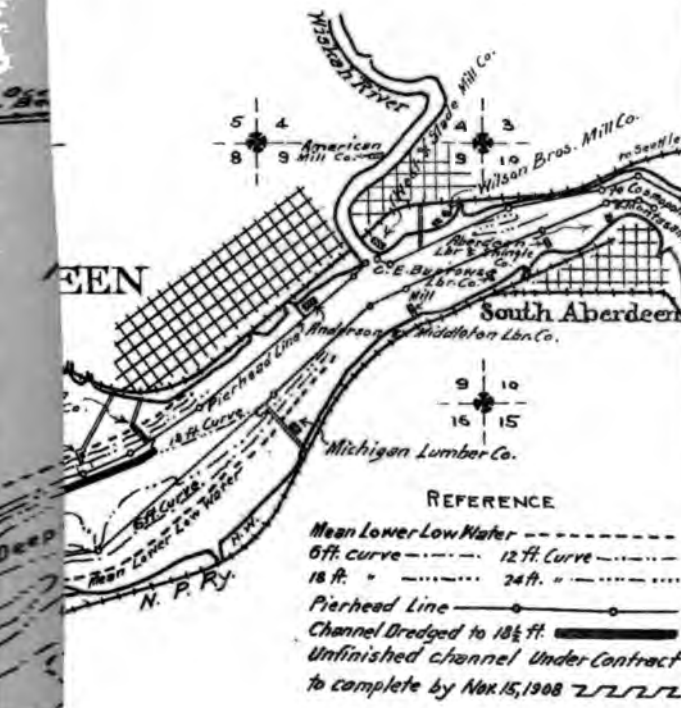
Money statement.

July 1, 1907, balance unexpended	$200,450.17
June 30, 1908, amount expended during fiscal year for works of improvement	108,045.44
July 1, 1908, balance unexpended	92,404.73
July 1, 1908, outstanding liabilities	387.50
July 1, 1908, balance available	92,017.23
July 1, 1908, amount covered by uncompleted contracts	86,526.73
Amount (estimated) required for completion of existing project	[a] 75,000.00

[a] The project call for a channel 200 feet wide. With the funds appropriated by act of March 2, 1907, a channel of the proposed width could not be obtained on account of the excess in cost per cubic yard over the estimated cost.



Typical Channel Sections



With annual report,

Major of Engineers, U.S.A.

APPROPRIATIONS.

GRAYS HARBOR, INNER PORTION, BETWEEN ABERDEEN AND THE ENTRANCE TO SAID HARBOR, AND CHEHALIS RIVER, WASHINGTON.

Act of July 13, 1892	$50,000
Act of August 18, 1894	25,000
Act of June 13, 1902	50,000
Act of March 3, 1905	30,000
Act of March 2, 1907	177,000
Total	332,000

IMPROVEMENT OF CHEHALIS RIVER, WASHINGTON.

August 2, 1882	$3,000	June 3, 1896	$3,000
July 5, 1884	2,500	March 3, 1899	3,000
August 11, 1888	2,000		
September 19, 1890	3,000	Total	19,000

CONTRACTS IN FORCE.

Contractor: North American Dredging Company.
Date of contract: August 8, 1907.
Date of approval: September 5, 1907.
Date of commencement: December 13, 1907.
Date of completion: October 12, 1908.

COMMERCIAL STATISTICS.

Local traffic.

	Quantity.	Value.
	Tons.	
Beer	392	$18,188
Beef, fresh	72	14,400
Brick and cement	48	1,920
Butter	24	14,400
Clams	225	6,750
Coal and iron	743	27,440
Fish	958	35,280
Flour, feed, and barley	478	21,230
Fruit and vegetables	448	14,575
Ice	420	8,400
Machinery	376	172,900
Milk	1,520	57,000
Oil	352	21,120
Miscellaneous merchandise	3,363	274,100
Total	9,414	687,703

Five hundred and forty-nine million one hundred and forty thousand five hundred and eighty-three feet B. M. of saw logs, valued at $6,391,458, were towed to the mills on Grays Harbor during the year.

Number of passengers carried, 19,720.

X X 4.

IMPROVEMENT OF PUGET SOUND AND ITS TRIBUTARY WATERS, WASHINGTON.

The only special work, in addition to the usual operations of the snag boat, was the removal of the rock in the entrance to Roche Harbor, on San Juan Island. A contract was let for this work July 13, 1907, for $23,460. Work was begun October 1, 1907, and completed April 17, 1908. Maps showing the new depths over the rock have been furnished the Superintendent, Coast and Geodetic Survey, and the Hydrographic office, San Francisco.

This work is interesting from the method adopted. The method had in mind when the proposals were put out was to build a fixed platform over the rock, drill holes about 3 feet from center to center to a depth 3 feet below that required, to load heavily and fire simultaneously, and to clear the débris away with a dipper dredge, or an extemporized drag.

The plan adopted by the contractors, which had previously been successfully applied to a similar rock in California, is what is locally called "bulldozing." Charges of from 5 to 50 pounds of 70 per cent dynamite or gelatin were placed on the surface of the rock by a diver and then fired. After a number of shots had been fired in this manner the débris was cleared off with a dipper dredge and the operation was then repeated.

The method, as applied to this case, did not prove satisfactory, and the contractors state that if they had the work to do over they would drill the rock.

The snag boat worked in nearly all the tributary waters of the sound, mainly, as usual, in the Skagit River. It also helped somewhat in the Swinomish Slough work. The work done during the year in snagging was as follows:

Snags and other obstructions disposed of in—		
Skagit River and tributaries		1,478
Snohomish River and tributaries		198
Stilaguamish River		68
Puyallup River		270
Swinomish Slough		514
Samish River		41
Quartermaster Harbor		234
Total		2,803
Total length of snags	feet	53,685
Largest diameter	do	14
Smallest diameter	inches	6

The snag boat also assisted on the work of dike construction at Swinomish Slough.

It is highly important to replace the snag boat by a new boat next season. The boat is now too old and worn, both in hull and equipment, to be repaired economically. What is needed is a new boat with a small suction-dredge attachment which can be used for cleaning up work and removing bars and doing dredging on a small scale. This would prove a valuable feature of the plant, because of the considerable application which would be made of it. There is a good deal of small work of this class which is not of sufficient magnitude to justify asking for bids. There are often lulls in the snagging work,

particularly during extreme high and low water, and the snag-boat crew could, without additional expense, be employed in dredging.

It is estimated that the proposed plant can be built for about $75,000.

Money statements.

GENERAL IMPROVEMENT.

July 1, 1907, balance unexpended		$73,438.93
July 1, 1907, received from sales		3.00
June 30, 1908, amount expended during fiscal year, for works of improvement		49,504.63
July 1, 1908, balance unexpended		23,937.30
July 1, 1908, outstanding liabilities		4,425.63
July 1, 1908, balance available		19,511.67
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$115,000.00	
For maintenance of improvement	15,000.00	
		* 130,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

EMERGENCIES IN RIVERS AND HARBORS.

July 1, 1907, balance unexpended	$366.82
June 30, 1908, amount expended during fiscal year for maintenance of improvement	366.82

APPROPRIATIONS.

June 14, 1880	$2,500.00	March 3, 1899	$20,000.00
August 2, 1882	20,000.00	June 13, 1902	35,000.00
July 5, 1884	10,000.00	April 28, 1904 (allotment)	12,000.00
August 5, 1886	10,000.00	March 3, 1905	20,000.00
August 11, 1888	15,000.00	March 3, 1905 (allotment)	4,500.00
September 19, 1890	12,000.00	March 2, 1907	75,000.00
July 13, 1892	15,000.00	Received from sales	163.15
August 18, 1894	14,000.00		
June 3, 1896	75,000.00	Total	340,163.15

CONTRACTS IN FORCE.

Contractor: Puget Sound Bridge and Dredging Company.
Date of contract: July 13, 1907.
Date of approval: August 10, 1907.
Date of commencement: October 1, 1907.
Date of completion: April 17, 1908.

* Construction of dredge and snag boat, $75,000; operation of vessel, $40,000; operation of inspection launch, $10,000; incidentals, $5,000.

COMMERCIAL STATISTICS.

SKAGIT RIVER.

Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Agricultural implements			82	$17,876
Coal			320	1,920
Dairy products	3,610	$44,800	1,000	20,000
Eggs	54	15,120		
Fish	937	112,440		
Flour			310	1,550
Fruit and vegetables	748	43,790	382	12,100
Fuel oil			1,713	10,281
Grain	7,810	197,060	1,328	53,120
Hardware and building material			386	44,900
Hay	2,728	33,120		
Hides	104	16,560		
Live stock	160	21,466	146	19,900
Lumber			320	6,400
Machinery			512	105,960
Miscellaneous merchandise	589	60,198	4,393	455,575
Wagons	10	1,200	48	33,060
Total	16,750	545,754	10,940	782,642

Sixty-seven million four hundred ninety-eight thousand nine hundred and eighty feet B. M. of saw logs, 32,695 linear feet of piling, 40,700 cords of shingle bolts, and 1,631 cords of wood were floated down the river and towed to the mills during the year. Total value, $970,303.

Nine steamers, with an aggregate gross tonnage of 2,071 tons and maximum draft of 5 feet, and 12 launches, with an aggregate gross tonnage of 75 tons and maximum draft of 5 feet, were engaged in traffic on the river during the year.

SNOHOMISH RIVER.

Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Cement			2,400	$1,590
Grain	3,280	$85,280	1,130	29,380
Hay			2,360	25,960
Salmon	394	27,280		
Lime and lime rock			5,110	8,500
Machinery			831	168,200
Miscellaneous merchandise	100	4,000	2,110	122,200
Lumber and products	12,049	340,988		
Pulp and paper	3,305	263,000		
Total	19,128	720,548	13,941	355,830

Two hundred and forty-five million five hundred and thirteen thousand eight hundred and ninety-seven feet B. M. of saw logs, 4,106,673 linear feet of piling, 8,000 cords of shingle bolts, and 6,575 cords of wood were floated down the river and towed to the mills during the year. Total value, $3,227,286.

Eight vessels, with an aggregate gross tonnage of 2,099 tons and maximum draft of 5 feet, were engaged in traffic on the river above Everett, and about 30 tugs were engaged in towing logs from and into the river during the year.

STILAGUAMISH RIVER.

Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Agricultural implements			28	$5,680
Eggs	17	$4,250		
Fish	67	13,280		
Flour			88	4,400
Fruit and vegetables	118	2,138	190	4,770
Grain	2,118	55,068	321	11,235
Hardware and building material			132	26,600
Hay	308	3,388		
Hides	38	6,620		
Live stock	48	4,960	37	6,000
Lumber	280	4,200		
Machinery			38	6,067
Miscellaneous merchandise	166	12,863	1,110	204,683
Wagons	3	180	23	2,760
Wool	4	880		
Total	3,167	107,827	1,967	272,195

Fifty-five million feet B. M. of saw logs and 15,079 cords of shingle bolts were floated down this river during the year. Total value, $531,143.

Four steam vessels and four launches, with an aggregate gross tonnage of 1,051 tons and maximum draft of 5 feet, were engaged in traffic on the river during the year.

DUWAMISH RIVER.

Local traffic.

Article.	Quantity.	Value.
	Tons.	
Brick	26,588	$94,885
Coal	6,000	15,000
Fish	100	10,000
Hay, feed, etc	400	9,900
Lumber	350	6,000
Miscellaneous merchandise	3,005	70,065
Sand and gravel	22,000	20,500
Total	58,443	226,350

Ten million feet B. M. of saw logs and 670,000 linear feet of poles and piling were towed on the river during the year. The water traffic is carried on by small tugs and launches towing barges.

NOOKSAK RIVER.

Eighteen thousand six hundred cords of shingle bolts, valued at $65,100, were floated down the river during the year.

X X 5.

INSPECTION OF FISH TRAPS, ETC., PUGET SOUND, WASHINGTON.

All traps have been periodically inspected during construction, while in operation, and during removal to insure that the traps were built according to approved plans, that proper lights and fog signals

were maintained on them, and that broken-off or submerged piles were not left where dangerous to navigation in removing the traps.

A launch for inspection purposes was built under authority of the Chief of Engineers to attend to this work and all other similar work on the sound.

The boat was completed and put into commission January 12, 1908. It was christened the *Vigilant*. The boat is 63 feet long, 11 feet 6 inches beam, and is driven by a 50-horsepower Ralaco gasoline engine.

ALLOTMENTS.

February 13, 1904	$4,000	February 23, 1907	$6,000
August 4, 1904	2,000	January 21, 1908	6,000
December 15, 1904	2,000		
April 17, 1905	5,000	Total	31,000
February 28, 1906	6,000		

CONTRACT IN FORCE.

Contractor: James W. Hall.
Date of contract: May 29, 1907.
Date of commencement: June 5, 1907.
Date of completion: September 5, 1907.
Date of completion: Extended to January 14, 1908.
Date of completion: January 14, 1908.

X X 6.

IMPROVEMENT OF HARBOR AT OLYMPIA, WASHINGTON.

There were no operations during the past fiscal year except general care of the work, inspections, and compilation of commercial statistics.

Money statement.

July 1, 1907, balance unexpended	$7,277.43
June 30, 1908, amount expended during fiscal year for maintenance of improvement	157.96
July 1, 1908, balance unexpended	7,119.47
July 1, 1908, balance available	7,119.47

APPROPRIATIONS.

July 13, 1892	$35,000
August 18, 1894	40,000
June 3, 1896	32,000
March 3, 1899	15,000
June 13, 1902	25,000
Total	147,000

COMMERCIAL STATISTICS.

Shipping.

[Except local traffic.]

	Arrivals.	Departures.
Steam vessels	8	8
Sail vessels	24	23
Total	32	31

Maximum draft, 32 feet.

LOCAL TRAFFIC.

Vessels engaged in local traffic made 2,605 trips during the year. Maximum draft of vessels engaged in local traffic, 8½ feet. Total tonnage of port, 847,731 tons.

Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Agricultural implements	204	$20,300	.....	.....
Beer	3,000	125,015	50	$1,600
Dairy and farm products	1,377	206,425	2,400	140,175
Fish, oysters, etc	2,385	161,706	4,235	294,689
Flour and feed	465	17,640	1,500	6,500
Grain	300	11,550	810	90,200
Hardware and building material	860	58,021	5,665	819,500
Hay	200	3,660	.....	.....
Household goods	648	35,000	1,000	81,000
Lumber and products	51,000	380,719	37	600
Machinery	257	25,700	620	73,000
Miscellaneous merchandise	1,822	143,094	8,561	519,946
Live stock	400	26,400	335	32,300
Wooden pipe	7,020	70,200	.....	.....
Wool	20	2,015	.....	.....
Total	69,958	1,287,445	25,213	1,559,510

Ninety-seven million feet B. M. of saw logs and 1,972 cords of shingle bolts were towed to and from the harbor during the year. Total value, $1,008,560.

X X 7.

IMPROVEMENT OF TACOMA HARBOR, WASHINGTON.

The operations of the year have consisted of the completion of preparations for dredging the Puyallup waterway. All the preliminary conditions required by Congress having been complied with, a contract for the work was entered into on October 3, 1907, with A. W. Tweeden & Co., of Tacoma. The contract included not only the dredging, but the building of the necessary bulkheads and the deposit of the dredged material on the lands adjacent to the waterway. The cost of the bulkheading and filling is borne by private interests, but the work is being done and the funds disbursed through the United States engineer office of the district.

The contractors have had to build their own plant, and owing to this delay of construction actual operations have only just begun.

The following extracts are taken from report of Assistant Engineer Eugene Ricksecker:

Puyallup waterway.—The lower portion of the Puyallup River is defined on paper by waterway lines laid out by the State of Washington and approved by the Secretary of War. The river enters the sound across extensive flats bare at low tide, crosses and recrosses the line without regard. While these and the adjacent harbor lines are carefully described and the initial point tied to United States Coast and Geodetic Survey stations, but two points at the inner end of the waterway were marked on the ground, the main angle points falling in the water.

The survey work of triangulating this portion of the harbor in order to locate the waterway is completed. The outer end of waterway and the adjacent flats nearly to high-water line have been cross sectioned, elevations being determined at intervals of 25 feet.

Bids were received for doing the dredging, filling, and bulkhead work, except back bulkheads, and contract let to lowest bidder, A. W. Tweeden & Co. Complying with the terms of this contract, they began work on December 26, 1907, by driving piles. Pending construction of their electric suction dredger no further work was done until March 19. Since then 1,140 piles have been driven, generally in 5-pile bents with 8-feet centers, aggregating 49,140 linear feet of piling or 1,795 linear feet of bulkhead. Three hundred cords of brush as a toe for enrockment and a quantity of planking to hold the fill has also been placed. The work of constructing their dredger progressed steadily and would have been in commission early part of May had a disastrous fire not occurred to the eastern firm manufacturing the ladder. This part has recently reached Tacoma and the machine was put in operation on June 20, and about 80,000 cubic yards were removed from the waterway by June 30.

Mr. Ricksecker's report makes the following reference to the city waterway, which was excavated by the Government four years ago:

City waterway.—It is gratifying to be able to report a large increase in the commerce of this waterway.

On July 1, 1903, when the Government undertook its improvement, half of the waterway was bare at low water and the commerce was very small. The improvement was completed April, 1905, and the growth of its commerce is shown in the following table. This commerce is the result of an improvement that cost the Government $160,000 in round numbers.

Year.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
1905	173,117	$8,923,914	[a] 112,371	$4,809,064
1906	255,314	10,171,918	197,387	4,402,016
1907	326,026	11,841,602	370,706	5,330,100

[a] This was reported as 225,947 tons, value $4,867,872, but included an abnormally large quantity of sand and gravel towed in on scows.

Money statement.

July 1, 1907, balance unexpended		$216,811.91
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$3,358.46	
For maintenance of improvement	3,381.36	
		6,739.82
July 1, 1908, balance unexpended		210,072.09
July 1, 1908, outstanding liabilities		599.50
July 1, 1908, balance available		209,472.59

July 1, 1908, amount covered by uncompleted contracts	$192,000.00
Amount (estimated) required for completion of existing project	40,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addtion to the balance unexpended July 1, 1908	40,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897.

APPROPRIATIONS.

CITY WATERWAY.

June 13, 1902	$75,000
March 3, 1903	100,000
Total	175,000

PUYALLUP WATERWAY.

March 3, 1905	$40,000
June 30, 1906	160,000
Total	200,000

CONTRACT IN FORCE.

Contractor: A. W. Tweeden & Co.
Date of contract: October 3, 1907.
Date of approval: October 19, 1907.
Date of commencement: December 26, 1907.
Date of completion: June 26, 1910.

COMMERCIAL STATISTICS.

Shipping.

[Except local traffic.]

	Steam vessels.	Sail vessels.	Total gross tonnage.
Arrivals	1,270	191	2,063,746
Departures	1,270	191	2,063,746

Maximum draft, 32.8 feet.

LOCAL TRAFFIC.

One hundred steamers, maximum draft 18½ feet, were engaged in local traffic during the year. These vessels made 9,100 trips.

Exports and imports.

Article.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Agricultural implements	1,866	$746,400		
Beer	650	41,600	40	$2,560
Cable and wire				
Coal and coke	149,361	612,308	2,713	13,014
Copper	53	15,900		
Copra	1,113	445,200	1,113	445,200
Cotton	12,552	2,761,440		
Fish, fresh and canned	2,012	227,795	6,133	473,106
Flour	137,078	6,080,219		
Fruit and vegetables	285	16,300	1,624	121,390

Exports and imports—Continued.

Article.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons		*Tons.*	
Grain	30,769	$861,389	9,200	$164,000
Gunnies	386	67,550	6,305	1,103,322
Hay	2,429	47,580	.....	.....
Hardware and building material	6,721	91,450	271,971	1,061,820
Hemp	1,728	172,800	7,604	760,400
Iron and steel	1,796	166,700	4,251	209,589
Live stock	199	29,850	164	24,600
Lumber and products	379,123	3,700,816	2,665	17,631
Machinery	1,509	365,500	217	54,250
Matting	.....	.....	4,452	979,440
Miscellaneous merchandise	72,823	7,255,283	126,180	5,352,479
Ore	339	50,850	89,558	5,022,588
Powder	1	150	3,052	492,345
Products of packing houses	2,538	382,700	74	12,660
Products of smelter	8,718	2,748,782	24	6,000
Rice	759	75,900	1,496	149,600
Sugar	283	25,580	4,844	532,840
Silk	.....	.....	169	1,014,000
Sheeting	563	281,500	.....	.....
Tea	37	9,250	4,804	1,201,000
Tin	.....	.....	163	20,688
Wines and liquors	1,235	494,000	1,788	715,200
Tobacco	993	238,320	208	49,920
Wheat	201,715	6,150,284	.....	.....
Total	1,019,584	34,163,376	550,812	19,999,642

One hundred and ninety million feet B. M. of saw logs and 27,000 linear feet of piling were towed to and from the harbor during the year. Total value, $1,458,263.

X X 8.

IMPROVEMENT OF WATERWAY CONNECTING PUGET SOUND WITH LAKES UNION AND WASHINGTON.

There were no field operations during the year except the operation and care of the dam at Fremont and the log canal at the portage and a general supervision of the right of way and of Lakes Union and Washington. The survey required by the act of Congress of March 2, 1907, was completed and a report submitted December 2, 1907. A harbor line map for Lake Union was prepared and received the approval of the Secretary of War January 4, 1908. Harbor line maps of Lake Washington were forwarded to the Department June 30, 1908.

Money statement.

July 1, 1907, balance unexpended		$9,030.88
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$5,000.00	
For maintenance of improvement	2,997.15	
		7,997.15
July 1, 1908, balance unexpended		1,033.73
July 1, 1908, outstanding liabilities		104.00
July 1, 1908, balance available		929.73
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908		10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

August 18, 1894	$25,000
June 3, 1896	150,000
June 13, 1902	160,000
March 3, 1905	125,000
March 2, 1907	10,000
Total	470,000

COMMERCIAL STATISTICS.

Shipping.

INNER SALMON BAY—BALLARD.

	Arrivals and departures.	Gross tonnage.
Sail vessels	19	12,584
Steam vessels	1	1,071
Total	20	13,655

OUTER SALMON BAY.

Sail vessels	1	2,000
Steam vessels	9	70,425
Total	10	72,425

Exports and imports.

Article.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Lumber and products	30,157	$345,810	2,406	$32,064
Logs			313,938	1,605,483
Miscellaneous merchandise	1,959	32,768	6,052	191,534
Total	32,116	378,578	322,396	$1,829,081

LAKES UNION AND WASHINGTON.

Local traffic.

Article.	Quantity.	Value.
	Tons.	
Agricultural implements	3	$750
Brick	530	1,533
Coal	16,012	39,397
Dairy and farm products	559	33,298
Hay and grain	510	14,875
Hardware and building material	53	2,930
Live stock	695	158,000
Lumber and products	9,066	188,800
Logs, shingle bolts, and piles	396,229	1,582,474
Machinery	137	31,700
Miscellaneous merchandise	12,545	1,248,220
Wood	6,377	10,882
Total	442,716	3,312,859

Sixteen vessels with an aggregate gross tonnage of 1,187 were engaged in traffic on the lakes.

Number of passengers carried, 500,000.

X X 9.

IMPROVEMENT OF HARBOR AT EVERETT, WASHINGTON.

No work was done during the year.

Expenditures during the year were for inspection of dredging done under private contracts and for inspections of existing works and examinations in connection with complaints in regard to obstructions to navigation.

Money statement.

July 1, 1907, balance unexpended		$7,745.37
June 30, 1908, amount expended during fiscal year:		
For works of improvement	[a] $3,000.90	
For maintenance of improvement	322.24	
		3,323.14
July 1, 1908, balance unexpended		4,422.23

APPROPRIATIONS.

August 18, 1895	$10,000	March 3, 1901	$90,000
June 3, 1896	20,000	June 28, 1902	117,000
March 3, 1899	50,000		
June 6, 1900	135,000	Total	422,000

COMMERCIAL STATISTICS.

Shipping.

	Arrivals and departures.	Total net tonnage.
Steam and sail vessels	218	279,939

Maximum draft, 32 feet.

Exports and imports.

Article.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Bullion	8,110	$1,400,000		
Lumber and products	59,647	433,800		
Flour	8,300	375,000		
Lime rock			14,450	$17,000
Miscellaneous merchandise	5,223	373,300	12,569	831,300
Ore	5,100	25,500	7,500	145,000
Paper	2,811	224,800		
Wheat	20,000	600,000		
Total	109,191	3,432,400	34,519	1,293,300

Two hundred and fifty-four million eight hundred thousand feet B. M. of saw logs and 4,417,000 linear feet of piles and poles were handled by tugs at Everett Harbor during the year.

[a] For purchase of land.

X X 10.

IMPROVEMENT OF SWINOMISH SLOUGH, WASHINGTON.

Work has been prosecuted actively throughout the entire year under the appropriation of March 2, 1907. It has consisted mainly of dike building and dredging. The dike work includes the extension of the dike leading from Fidalgo Island past Goat Island toward deep water in Saratoga Passage, and the building of a dike (which serves also as a breakwater) from Goat Island, parallel with the main dike just mentioned, to deep water. In both dikes a mound of stone has been built up to a height of 8 feet below low water. The Goat Island dike has been faced up with 3-inch plank for the purpose of forming a breakwater to arrest heavy waves and stop drift and make it practicable to enter the narrow channel when there is a strong south wind blowing.

The map shows the extent of dike constructed during the year. It exceeds by 1,000 linear feet the amount contemplated in the estimate. The quantities of material used were as follows:

Brush	cords	91.5
Rock	cubic yards	36,944
Piles	linear feet	41,471
Lumber	feet B. M.	349,412

Dredging was done at points marked "B," "D," "O," "P," and "Q" on the general map. The total quantity removed was about 480,000 cubic yards and the cost to the Government was almost exactly 10 cents per yard. All of the above work was done by contract, except that between B and D—about 55,000 cubic yards—which was done under a daily rental agreement for dredge crew and fuel at $300 per day.

It was intended to carry the dredging through Padilla Bay, but when it came to straightening the channel in the crooked portions at O, P, and Q, it seemed very important to make a more radical rectification than was at first proposed. The land for the required cuts was purchased from the Indians by the people of La Conner and donated to the Government, and a capacious channel was excavated, eliminating entirely the sharp bends which formerly made it very difficult for boats of any size to navigate the slough.

This extra work made it necessary to postpone for the present the work in Padilla Bay.

The rocky point at the southern extremity of Fidalgo Island has been removed down to the level of high water.

The work of the year has developed quite clearly the possibilities of this improvement, the cost of the necessary work, and the chief difficulties to be encountered. It is reasonably certain that hereafter brush work can be done for $3.50 per cord in place; pile work for 20 cents per linear foot driven; lumber for $14 per thousand in place; rock work for 75 cents per cubic yard in place, and dredging for 10 cents per cubic yard. With the new dredge soon to be available for the Portland and Seattle districts, it is entirely possible that the dredging can be done for even less than the above figures. The work done with a rented outfit during the past season cost only about 5 cents per cubic yard, although the charge for the outfit was high.

With the foregoing figures a very close estimate of the cost of any future work can be had.

Further study of this improvement has made it clear that it is of a specially meritorious character. It does not pertain to a particular locality, but is general in its bearing, affecting the navigation interests of the entire Sound. Hitherto navigation between the northern and southern portions of these inland waters has had to pass either through the open Strait of Juan de Fuca for 20 miles or through the difficult channel of Deception Pass, which opens on the strait and is exposed to the full force of storms coming from that direction. The smaller vessels find it unsafe to follow either route in heavy weather, and it is quite impossible to tow log rafts at such times by either route. The annual loss of timber in attempts to tow through the pass amounts to a considerable sum.

All of this small-boat traffic (which really amounts in the total to the larger part) ought to pass behind Whidby and Fidalgo islands via Saratoga Passage and Swinomish Slough, and there should be a regular packet service on the east side from Seattle to Bellingham, calling at Everett, Coupeville, La Conner, and Anacortes.

With a better channel through the slough these results would surely follow. There can be no question of the great value of such a route to the commercial interests of the sound.

This waterway has also a close relation to the system of defense of Puget Sound. If war should come and it were necessary to close Admiralty Inlet and Deception Pass, this passageway would be of great use commercially and might be of value to the defense in giving a route for small boats around to the rear of an enemy's line. At the same time it is capable of perfect defense, for it is very narrow and terminates directly at Goat Island, where it is presumed that defensive works will be erected.

On the whole this waterway deserves further attention from the Government, and it is believed that it should be deepened until it has 8 feet at mean lower low water. To secure and maintain this depth will require considerable dike work and dredging, and to make the channel at "Hole-in-the-wall" less crooked will require the removal of the extreme points of rock at three, and possibly four, points. The actual quantities of rock to be removed, however, will not be large, and as the rock would all be utilized in dike work near by the net cost of removal will be slight.

The work of dredging, as already pointed out, can be done very cheaply. The main portion is in Padilla Bay, but there will be considerable quantities at other points.

The chief difficulty to be overcome is to prevent the extensive banks of soft alluvium from washing back into the channel. This must be done by means of training dikes, which will in all cases serve as bulkheads to retain the deposits behind them, and in some cases, as in Saratoga Passage and Padilla Bay, as breakwaters against the prevailing winds. These necessary dikes are indicated on the map at E-F, K-L, N-N, and R-S. Owing to the exposure to southerly winds, which are sometimes very strong, and to the tidal currents which set right across the line of the dike and often carry considerable quantities of driftwood, it will be necessary to build the dike E-F stronger than any of the others. It is proposed to follow the con-

struction successfully used in A-B, except that the piles will be so spaced as to support a timber facing on the south side of the dike to break the waves and arrest drift.

All the other dikes will be in the nature of bulkheads to retain the deposits from dredging and to direct the low-water tidal flow through the dredged channel. This work will not be expensive.

The quantities of work of all classes required to carry out the plan above outlined are as follows:

Piles	linear feet	165,240
Timber	feet B. M.	1,096,300
Brush	cords	8,500
Rock fill	tons	62,000
Railroad rails	do	67
Spikes and bolts	pounds	40,000
Dredging	cubic yards	827,000

In regard to maintenance, if the suggestions contained in another part of this report are carried out, the removal of shoals that may and probably will develop, until their tendencies are learned and provided against, will be very small. If the new snag boat is provided with a small dredging plant (12-inch suction) the snag boat crew can do this work as a part of its regular routine.

It often happens that snagging work is lacking, as in time of freshets or extreme low water, and as it is impracticable to lay off the crew for such short periods it would be really no extra cost to use them in this dredging work.

Money statement.

July 1, 1907, balance unexpended	$72,954.55
June 30, 1908, amount expended during fiscal year, for works of improvement	71,566.70
July 1, 1908, balance unexpended	1,387.85
July 1, 1908, outstanding liabilities	1,387.85
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908	10,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

APPROPRIATIONS.

July 13, 1892	$25,000	March 3, 1905	$5,000
August 18, 1894	25,000	March 2, 1907	75,000
June 3, 1896	25,000		
March 3, 1899	20,000	Total	205,000
June 13, 1902	30,000		

CONTRACT IN FORCE.

Contractor: Puget Sound Bridge and Dredging Company.
Date of contract: September 30, 1907.
Date of approval: October 12, 1907.
Date of commencement: November 19, 1907.
Date of completion: March 19, 1908.

COMMERCIAL STATISTICS.

Exports and imports.

Article.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Va
	Tons.		*Tons.*	
Agricultural implements			814	
Fish	1,466	$47,790		
Fruit and vegetables				
Grain	22,565	586,740		
Gravel and sand			865	
Hay	13,260	199,880		
Live stock	125	10,400		
Lumber and products	1,155	7,000	15	
Miscellaneous merchandise	151	48,596	3,373	
Wood			2,500	
Total	38,722	900,406	7,567	

Fifty-two million and thirty-six thousand feet B. M. of saw logs and cords of shingle bolts were towed through Swinomish Slough during the Total value, $624,250.

X X II.

IMPROVEMENT OF NEW WHATCOM (BELLINGHAM) HARBO WASHINGTON.

There have been no operations during the past fiscal year.

Money statement.

July 1, 1907, balance unexpended	$2, 3
July 1, 1908, balance unexpended	2, 3

APPROPRIATIONS.

June 13, 1902	$
March 3, 1905	3
Total	

COMMERCIAL STATISTICS.

Shipping.

[Except local traffic.]

	Arrivals.	De ta
Steam and sail vessels	210	

Maximum draft, 32 feet.

Fifteen steam vessels were engaged in local traffic during the year.

S L A N

Exports and imports.

Article.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Agricultural implements	78	$15,920	67	$12,880
Coal	20	100	1,360	6,750
Fish	2,665	276,610	16,561	883,900
Flour and grain	3,404	101,520	1,348	39,270
Fruit and vegetables	930	67,650	1,976	189,010
Hay	2,708	37,912	1,231	17,234
Hides	340	102,000	230	69,000
Hardware and building material	622	38,700	3,304	149,819
Lumber and products	257,446	2,619,921	.....	.....
Live stock	120	14,440	440	52,800
Machinery	560	84,000	190	28,500
Miscellaneous merchandise	4,282	369,280	18,601	1,806,280
Tin cans	600	105,000	400	69,300
Wool	90	36,000	40	16,000
Total	273,865	3,869,053	45,748	3,340,743

X X 12.

IMPROVEMENT OF COLUMBIA RIVER BETWEEN WENATCHEE AND BRIDGEPORT, WASHINGTON.

This improvement consists exclusively in the removal of ledge rock and bowlders, a large portion of which is below low water. Owing to the great range of the river between high and low water and the short period during which it is at stage low enough for practicable operations, it was not possible to take up more than one of the several works embraced in the project. This was at Methow Rapids. Assistant Engineer Eugene Ricksecker was in charge, and the following extracts from his report describe the work accomplished:

The plan for improvement of Methow Rapids was to remove points A, B, C, and J to about 7 feet below low water, or to the general slope of bottom of river and exposed adjacent shore, and to remove the jagged rock points along shore and inner (high water) channel back of these points.

Point A.—One hundred and nineteen holes, aggregating 1,795 feet, were drilled. These were loaded with 1,873 pounds of 40 per cent powder, and 4,790 pounds of 60 per cent, and fired with electric battery in two benches. Four thousand five hundred and five pounds of powder was used in springing holes and bulldozing. The rock was badly seamed and very irregular, making it impossible to place the holes where desired. Five thousand and six cubic yards of rock were removed.

Point B.—The top of this point was removed some years ago, but it was still too high and dangerous for navigation. Seventy-two holes aggregating 853 feet were drilled, loaded with 2,404 pounds powder and fired in steps, removing 2,966 cubic yards of rock. One thousand seven hundred and four pounds powder was used in springing holes and bulldozing.

Point C.—A considerable quantity of loose rock left by former blasts on this point that had become filled in with sand, making a tight mass, had to be removed before drilling could be done. Over 1,500 cubic yards of this material was removed by hand. One hundred and three holes, aggregating 1,279 feet, were drilled, loaded with 4,408 pounds of powder and fired in steps, removing 5,750 cubic yards of material. One thousand nine hundred and thirty pounds of powder was used in springing holes and bulldozing.

Point J.—This was a nearly solid mass of very hard waterworn rock. Forty-six holes, aggregating 782 feet, were drilled, loaded with 3,800 pounds of 60 per cent dynamite, and fired in one mass, removing 4,555 cubic yards of rock. One thousand eight hundred and nine pounds of powder was used in springing

holes and bulldozing. The results obtained on this point were the most satisfactory.

Although the efficacy of the work done will not be fully known until the season of high water in the river has passed, I am advised by navigators that the river at this point is already noticeably easier than formerly.

The work is at present without an adequate plant, and its execution is very much handicapped by this fact. A recommendation has been submitted, and has received the approval of the Secretary of War, for the appropriation of $75,000 for the purchase of a plant.

Money statement.

July 1, 1907, balance unexpended	$42,000.00
June 30, 1908, amount expended during fiscal year for works of improvement	22,069.31
July 1, 1908, balance unexpended	19,930.69
July 1, 1908, outstanding liabilities	731.52
July 1, 1908, balance available	19,198.48

APPROPRIATION.

Act of March 2, 1907 ..... $42,000

COMMERCIAL STATISTICS.

Exports and imports.

Articles.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Agricultural implements and machinery			1,182	$265,000
Flour, wheat, and oats	25,921	$707,000		
Fruit	3,238	135,000		
Hardware			1,723	500,000
Lumber and products			830	23,000
Miscellaneous merchandise	1,954	141,000	7,058	1,305,000
Live stock	220	15,550		
Total	31,333	998,550	10,793	2,093,000

Four steamers, maximum draft 5½ feet, were operated on the river during the year.

Number of passengers carried, 19,187.

X X 13.

IMPROVEMENT OF OKANOGAN AND PEND OREILLE RIVERS, WASHINGTON.

No work was done on either the Pend Oreille or Okanogan rivers during the year. Bids were invited for work on the Pend Oreille River, September 16, 1907, but none were received. Proposals were again invited May 25, 1908, and resulted in the receipt of one conditional proposal to do the work at 50 cents per cubic yard. This proposal has been rejected.

Money statements.

OKANOGAN RIVER.

July 1, 1907, balance unexpended		$4,056.79
June 30, 1908, amount expended during fiscal year:		
By transfer to Pend Oreille to correct error	$2,000.00	
For maintenance of improvement	75.00	
		2,075.00
July 1, 1908, balance unexpended		1,981.79

PEND OREILLE RIVER.

July 1, 1907, balance unexpended	$18,820.69
To transfer from Okanogan on account of error	2,000.00
June 30, 1908, amount expended during fiscal year, for maintenance of improvement	743.47
July 1, 1908, balance unexpended	20,077.22

APPROPRIATIONS.

March 3, 1899	$25,000
June 13, 1902	22,500
March 3, 1905	15,000
March 2, 1907	20,000
Total	82,500

COMMERCIAL STATISTICS.

Exports and imports.

OKANOGAN RIVER.

Article.	Exports.		Imports.	
	Quantity.	Value.	Quantity.	Value.
	Tons.		*Tons.*	
Agricultural implements and machinery			171	$30,000
Fruit	12	$500		
Hardware			268	72,000
Lumber and products			91	3,000
Miscellaneous merchandise	40	6,600	1,370	260,000
Ore				
Wool	88	28,000		
Total	140	35,100	1,900	365,000

Five steamers, with an aggregate gross tonnage of 1,433 tons and maximum draft of 5 feet, were engaged in traffic on the river during the year.

Local traffic.

PEND OREILLE RIVER.

Article.	Quantity.	Value.
	Tons.	
Miscellaneous merchandise	1,427	$142,000
Lumber	800	10,500
Total	2,227	152,500

Four thousand tons of poles, valued at $80,000, were towed to Newport during the year.

Three steam vessels, with an aggregate gross tonnage of 429 tons and maximum draft of 4 feet, were engaged in traffic on the river during the year.

APPENDIX Y Y.

RIVER AND HARBOR IMPROVEMENTS IN THE DISTRICT OF ALASKA.

REPORT OF CAPT. G. B. PILLSBURY, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. St. Michael Canal, Alaska.
2. Removing sunken vessels or craft obstructing or endangering navigation.

UNITED STATES ENGINEER OFFICE,
Skagway, Alaska, June 30, 1908.

SIR: I have the honor to submit herewith annual report for the fiscal year ending June 30, 1908, of river and harbor works in my charge.

G. B. PILLSBURY,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

Y Y 1.

IMPROVEMENT OF ST. MICHAEL CANAL, ALASKA.

OPERATIONS DURING PAST FISCAL YEAR.

A contract was entered into September 25, 1907, as shown in detail under "Contract in force," for dredging the channel to deep water in the canal. As Bering Sea is closed by ice early in the fall, no work was attempted until the opening of navigation in June, 1908, when the contractors dispatched a dredge and equipment for the site. Active operations will begin shortly after July 1.

Money statement.

July 1, 1907, balance unexpended	$98,000.00
Deposited to credit of Treasurer of United States, refundment of overpayment	7.60
Amount appropriated by sundry civil act approved May 27, 1908	150,000.00
	248,007.60
June 30, 1908, amount expended during fiscal year, for works of improvement	2,758.57
July 1, 1908, balance unexpended	245,249.03
July 1, 1908, outstanding liabilities	1,819.31
July 1, 1908, balance available	243,429.72
July 1, 1908, amount covered by uncompleted contracts	235,000.00

APPROPRIATIONS.

March 2, 1907	$98,000.00
May 27, 1908	150,000.00
	248,000.00
Refundment	7.60
Total	248,007.60

CONTRACT IN FORCE.

Name of contractor: North American Dredging Company.

Amount and character of work: Excavating and removing all material in channel, or section A, no frozen ground to be dredged, 162,000 cubic yards.

Price per unit: $1.45 per cubic yard.

Date of approval: November 9, 1907.

Date of beginning work: Season of 1908.

Date of expiration: Season of 1910.

COMMERCIAL STATISTICS.

[Furnished by the Northern Navigation Company, of San Francisco, Cal.]

Commercial statistics at port of St. Michael, Alaska, for calendar years 1906–7.

	1906.	1907.
Inward from ocean vessels and river boats:		
Coal from ocean vessels ... tons	2,467	4,252
Fuel oil (crude) from ocean vessels ... do	6,064	7,718
Lumber from ocean vessels ... do	1,026	723
General merchandise from ocean vessels ... do	30,472	27,134
Foreign merchandise in transit ... do	662	1,279
Total tonnage from ocean vessels	40,691	41,106
Passengers landed from ocean vessels	1,047	938
Value of domestic goods landed from ocean vessels	$3,740,318	$3,136,280
Value of foreign goods landed from ocean vessels	$89,111	$62,769
Landed from river boats ... tons	327	210
Landed from coastwise vessels ... do	190	120
Value of goods landed from river boats	$130,800	$84,000
Value of goods landed from coastwise steamers	$20,300	$13,200
Passengers landed from river boats	1,658	1,583
Gold dust and bullion landed from river boats	$2,728,000	$539,241
Arrivals—		
Ocean steamers	87	108
Ocean sailing vessels	6	8
Ocean tonnage	99,555	100,809
River boats	75	77
River barges	48	61
River tonnage (river boats and barges)	43,154	53,417
Outward:		
General merchandise shipped on ocean steamers ... tons	541	260
Value of general merchandise shipped on ocean steamers	$167,577	$167,860
Gold dust and bullion shipped on ocean steamers	$2,729,886	a $541,741
Passengers sent out on ocean steamers	2,518	2,480
Foreign goods shipped to foreign Yukon River ports ... tons	662	1,279
Domestic goods shipped to foreign Yukon River ports ... do	954	1,465
Fuel oil (crude) shipped to United States Yukon River ports ... do	4,250	4,189
Domestic goods shipped to United States Yukon, Tanana, and Koyukuk river ports ... tons	26,133	22,860
Total shipped to Yukon, Tanana, and Koyukuk river ports ... do	31,999	29,793
Passengers sent out on river boats	459	408
Value of foreign goods shipped to foreign Yukon River ports	$89,111	$62,769
Value of domestic goods shipped to foreign Yukon River ports	$44,510	$76,348
Value of domestic goods shipped to United States Yukon, Tanana, and Koyukuk river ports	$2,665,566	$2,354,580
Total value of merchandise shipped to Yukon, Tanana, and Koyukuk river ports	$2,799,187	$2,493,697

a Gold shipments handled by United States mail, season 1907, quantity unknown.

Commercial statistics at port of St. Michael, Alaska, for calendar years 1906–7—Continued.

	1906.	1907.
Outward—Continued.		
Sailings—		
Ocean steamers	88	109
Ocean sailing vessels	6	8
Ocean tonnage	99,641	100,788
River boats	79	79
River barges	53	65
River tonnage (river boats and barges)	49,813	56,217
Harbor boats and tugs operated	7	7
Harbor lighters and barges operated	20	20
Harbor vessels' tonnage	5,150	5,150

The statistics of 1906, not being available at last report, are included in the above tabulation.

Y Y 2.

REMOVING SUNKEN VESSELS OR CRAFT OBSTRUCTING OR ENDANGERING NAVIGATION.

WRECK OF STEAMER ROCK ISLAND.

This steamer, owned by the Northern Navigation Company, of San Francisco, Cal., was sunk in the Tanana River, in front of the town of Chena, Alaska, during the break-up of the ice in the spring of 1906. An allotment of $500 for removal of the wreck was made May 1, 1907. An additional allotment of $1,350 was requested and made January 4, 1908. On February 25 an emergency contract was entered into with H. M. Henning for its removal, and the work was completed in March. Final report was made on June 13, 1908.

CONTRACT IN FORCE.

[Emergency.]

Name of contractor: H. M. Henning.
Amount and character of work: Removal of wreck lying within 7 feet of the present elevation of the surface of the ice.
Amount: $1,300.
Date of beginning work: Within seven days after date of contract.
Date of expiration: Within seven weeks from date of commencement.

APPENDIX Z Z.

RIVER AND HARBOR IMPROVEMENTS IN THE DISTRICT OF HAWAII.

REPORT OF CAPT. C. W. OTWELL, CORPS OF ENGINEERS, OFFICER IN CHARGE FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENTS.

1. Pearl Harbor, Hawaii.
2. Honolulu Harbor, Hawaii.
3. Reclamation of Quarantine Island, Honolulu, Hawaii.
4. Hilo Harbor, Hawaii.

UNITED STATES ENGINEER OFFICE,
Honolulu, Hawaii, July 14, 1908.

SIR: I have the honor to submit herewith annual report upon the works of improvement under my charge for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

C. W. OTWELL,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

Z Z 1.

IMPROVEMENT OF PEARL HARBOR, HAWAII.

There were no operations during the fiscal year. The expenditures were for tide gauge and office expenses.

Money statement.

July 1, 1907, balance unexpended	$676.38
June 30, 1908, amount expended during fiscal year for maintenance	223.72
July 1, 1908, balance unexpended	452.66
July 1, 1908, outstanding liabilities	26.72
July 1, 1908, balance available	425.94

APPROPRIATION.

March 3, 1899	$100,000

COMMERCIAL STATISTICS.

There is no commerce as yet in this harbor.

Z Z 2.

IMPROVEMENT OF HONOLULU HARBOR, HAWAII.

For history and description of the work done at this locality, see page 852 of this report and pages 803 and 2233 of the Annual Report of the Chief of Engineers for 1907.

A continuing contract was approved December 6, 1907, for dredging in sections B and C, and under it dredging was commenced February 3, 1908, 221,016 cubic yards of material having been removed.

It is proposed to apply the balance available to continuing the work of dredging section B and such portion of section C as funds permit. The reclamation of Sand Island will be continued and a small portion of private lands (belonging to the Dowsett Company (Limited), omitted under previous work will be reclaimed. The additional appropriation asked for will be used in continuing the work projected in section C, and removing the shoals which have developed over areas previously dredged.

Money statement.

July 1, 1907, balance unexpended	$237,529.40
Refundment of overpayment	3.33
Amount appropriated by sundry civil act approved May 27, 1908	200,000.00
	437,532.73
June 30, 1908, amount expended during fiscal year, for works of improvement	69,136.38
July 1, 1908, balance unexpended	368,396.35
July 1, 1908, outstanding liabilities	1,687.26
July 1, 1908, balance available	366,709.09
July 1, 1908, amount covered by uncompleted contracts	355,825.58
Amount (estimated) required for completion of existing project	828,894.60
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	500,000.00

APPROPRIATIONS.

March 3, 1905	$200,000.00
June 30, 1906	200,000.00
March 2, 1907	200,000.00
May 27, 1908	200,000.00
	800,000.00
Refundments	3.33
Receipts from sales	8.00
	800,011.33

CONTRACT IN FORCE.

Contractor: Hawaiian Dredging Company (Limited).
Character of work: Dredging.
Rate: 97 cents per cubic yard, place measurement.

Date of approval: December 6, 1907.
Date of beginning work: February 3, 1908.
Date of completion: August 20, 1909.

COMMERCIAL STATISTICS.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907, FOR THE PORT OF HONOLULU, HAWAII.

[Furnished by the collector of customs of the port of Honolulu.]

Number and tonnage of vessels entering and clearing during the year.

	Steam vessels.	Sailing vessels.	Total.	Total tonnage.
Entered	236	88	324	954,894
Cleared	252	75	327	945,533
Total	488	163	651	1,900,427

Duties on imports collected $1,483,107.20
All moneys collected at custom-house 1,549,169.81

Commerce between Honolulu and the United States and foreign ports during calendar year 1907.

Class.	Quantity.	Value.
RECEIPTS.		
From foreign countries:	*Tons.*	
Food supplies		$1,254,955
Coal	109,332	280,319
Spirits		286,619
Fertilizer	10,364	198,210
Cement	6,678	62,664
Chemicals		957,315
Iron and steel		32,490
Cottons		104,563
Bags	5,086	728,742
Miscellaneous		464,682
Total	131,460	4,370,559
From the United States to the district of Hawaii:		
Food supplies (including animal food)		3,526,537
Cars, carriages, and parts of		459,313
Chemicals, drugs, etc		662,220
Cotton, and manufactures of		1,704,507
Fertilizer	19,983	836,261
Iron and steel, manufactures of		2,070,863
Leather, and manufactures of		543,246
Oils		1,038,079
Paper, and manufactures of		359,045
Spirits		558,271
Tobacco, and manufactures of		510,797
Wood, and manufactures of		931,824
Wool, and manufactures of		331,677
Miscellaneous		2,189,434
Total district of Hawaii		15,732,074
Total subports		3,126,572
Total Honolulu		12,605,502
SHIPMENTS.		
To noncontiguous territories and foreign countries:		
Sugar	232,514	16,312,496
Fruits		656,915
Coffee	441	104,067
Hides and skins	461	106,310
Rice	1,530	141,365
Miscellaneous		697,742
Total	234,946	18,018,895

The commerce of the port of Honolulu for the past calendar year was valued at $34,948,746, and amounted to more than 386,389 tons.

PASSENGERS.

Number of passengers departed for foreign countries	5,095
Number of immigrant aliens admitted	18,630
Number of nonimmigrant aliens admitted	333
Number of United States of America citizens admitted	424

LOCAL COMMERCE.

[Between Honolulu and island ports.]

This commerce to a great extent is the distribution and collection of the commerce set forth in the above lists. From statement furnished by the Inter-Island Steam Navigation Company (Limited), this commerce during the past calendar year was as follows:

Freight (sugar and miscellaneous articles)	tons	299,611
Passengers		62,191

In addition to the commerce actually received at and shipped from this port, all that commerce between the United States, the Orient, and Australia, carried by ships calling at this port is directly and equally benefited by this improvement, safer and speedier entrance and exit being afforded the ships carrying it.

Z Z 3.

RECLAMATION OF QUARANTINE ISLAND, HONOLULU, HAWAII.

For history and projects, see pages 804 and 2236 of the Annual Report of the Chief of Engineers for 1907.

Work was carried on under the modified project approved June 17, 1907, and was completed March 4, 1908, a total of 9,783.5 cubic yards having been placed on the island.

Money statement.

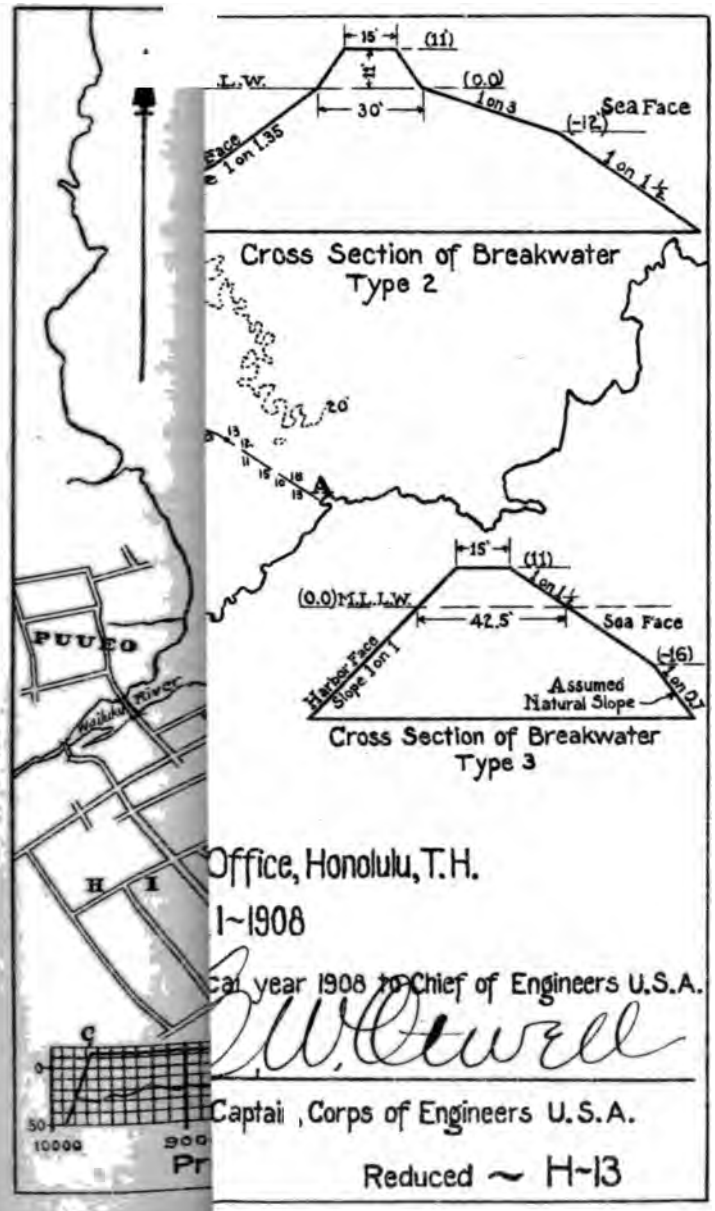
July 1, 1907, balance unexpended	$3,628.54
Refundment	2.67
	3,631.21
June 30, 1908, amount expended during fiscal year for works of improvement	3,628.46
July 1, 1908, balance unexpended	2.75
July 1, 1908, outstanding liabilities	2.75

APPPROPRIATION.

February 27, 1906	$20,000.00
Refundment of overpayment	2.67

COMMERCIAL STATISTICS.

For commercial statistics, see report for improving Honolulu Harbor, Hawaii.


15'
(11)
H
L.W.
(0.0)
1 on 3
30'
Sea Face
(-12')
1 on 1½
Face
1 on 1.35
Cross Section of Breakwater
Type 2
20
A
15'
(11)
1 on 1½
(0.0) M.L.L.W.
42.5'
Sea Face
Harbor Face
Slope 1 on 1
(-16)
1 on 0.7
Assumed
Natural Slope
Cross Section of Breakwater
Type 3
PUUEO
Nuuanu River
H 1
C
0
50
10000
900
Pr
Office, Honolulu, T.H.
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Z Z 4.

IMPROVEMENT OF HILO HARBOR, HAWAII.

For history and project of this work, see current summary, page 854, and page 805 of the Annual Report of the Chief of Engineers for 1907.

A contract for construction of the breakwater was entered into on May 23, 1908, but at the close of the fiscal year no actual work on breakwater had been done.

Money statement.

July 1, 1907, balance unexpended	$200,000.00
Amount appropriated by sundry civil act approved May 27, 1908	100,000.00
	300,000.00
June 30, 1908, amount expended during fiscal year for works of improvement	1,725.13
July 1, 1908, balance unexpended	298,274.87
July 1, 1908, outstanding liabilities	260.78
July 1, 1908, balance available	298,014.09
July 1, 1908, amount covered by uncompleted contracts	260,000.00
Amount (estimated) required for completion of existing project	1,400,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897.	600,000.00

APPROPRIATIONS.

March 2, 1907	$200,000
May 27, 1908	100,000
Total	300,000

CONTRACT IN FORCE.

Contractor: Delbert E. Metzger, Hilo, Hawaii.
Character of work: Breakwater construction.
Rate: $2.485 per ton of 2,000 pounds for stone in place in breakwater.
Date of contract: May 23, 1908.
Date of approval: Notice of approval not yet received.
Date of beginning work: Within sixty days after date of notification of approval of contract by the Chief of Engineers.
Date of completion: Within three years after said date of notification.

COMMERCIAL STATISTICS.

COMMERCIAL STATISTICS FOR THE CALENDAR YEAR ENDING DECEMBER 31, 1907, FOR THE PORT OF HILO, HAWAII.

[Furnished by the collector of customs.]

Number and tonnage of vessels entering and clearing during the year.

	Steam vessels.	Sailing vessels.	Total.	Total tonnage.
Entered	14	8	22	39,037
Cleared	24	23	47	42,688
Total	38	31	69	81,725

Duties on imports collected ..... None.
All money collected at custom-house $168.23

Commerce between Hilo and the United States and foreign ports during calendar year 1907.

Class.	Quantity.	Value.
Shipments to noncontiguous territories and foreign countries:	*Tons.*	
Sugar	77,053	$5,201,772
Fruits	.....	16,128
Hides and skins	39	8,429
Coffee	54	14,448
Miscellaneous	.....	46,877
Total	77,146	5,287,654
Receipts from the United States, miscellaneous	.....	1,720,269
Total	.....	7,007,923

APPENDIX A A A.

RIVER AND HARBOR IMPROVEMENTS IN THE DISTRICT OF PORTO RICO.

REPORT OF MAJ. CHAS. L. POTTER, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

IMPROVEMENT.

San Juan Harbor, Porto Rico.

UNITED STATES ENGINEER OFFICE,
Tompkinsville, N. Y., July 10, 1908.

SIR: I have the honor to forward herewith annual reports upon works of river and harbor improvements under my charge in Porto Rico for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

CHAS. L. POTTER,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

IMPROVEMENT OF HARBOR AT SAN JUAN, PORTO RICO.

Contract was entered into September 21, 1907, with the Standard Dredging Company, of Wilmington, Del., for dredging San Juan Harbor, at a cost of 19 cents per cubic yard for soft material (scow measurement) and $6.80 per cubic yard of coral rock (place measurement). The contractor towed his plant from Baltimore to San Juan and began work dredging at La Puntilla January 21, 1908. Work was continued on this point until April 7, when the plant was moved to the inner harbor. The point has been removed to a depth of 30 feet, except a few small reefs of solid rock which the dipper could not handle and must be removed by blasting. Over these there is a least depth of 25 feet, which is sufficient for commerce, and relieves the difficulty of making the turn around the point. The area dredged at this point amounts to 27,000 square yards, and in the harbor to 165,000 square yards, and the total amount of material removed has been 498,323 cubic yards, of which 497,266 was soft material and 1,057 rock.

During the month of June, 1908, the total amount removed was about 138,000 cubic yards, calling for a monthly payment of more than $26,000. As the contractor plans to put on an entirely different plant for rock, and as the price of rock ($6.80) will make the estimate run into high figures, it will be necessary to have the total amount authorized made available for the fiscal year ending June 30, 1910.

Money statement.

July 1, 1907, balance unexpended	$156,520.00
Amount appropriated by sundry civil act approved May 27, 1908	220,000.00
	376,520.00
June 30, 1908, amount expended during fiscal year for works of improvement	73,178.78
July 1, 1908, balance unexpended	303,341.22
July 1, 1908, outstanding liabilities	26,588.26
July 1, 1908, balance available	276,752.96
July 1, 1908, amount covered by uncompleted contracts	276,752.96
Amount (estimated) required for completion of existing project	380,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, for works of improvement, in addition to the balance unexpended July 1, 1908 Submitted in compliance with requirements of sundry civil act of June 4, 1897.	380,000.00

APPROPRIATIONS.

March 2, 1907	$157,500
May 27, 1908	220,000
Total	377,500

CONTRACT IN FORCE.

Contractor: Standard Dredging Company, Wilmington, Del.

Rates: Removing soft material (scow measurement), 19 cents per cubic yard; removing coral rock (place measurement), $6.80 per cubic yard.

Date of approval: October 10, 1907.

Date of commencement: January 21, 1908.

Date of completion: Indefinite.

APPENDIX B B B.

ANNUAL REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
Washington, D. C., July 13, 1908.

SIR: The Board of Engineers for Rivers and Harbors has the honor to submit the following report of its operations during the fiscal year ending June 30, 1908. Information concerning the organization of the Board and its duties, as prescribed by the act approved June 13, 1902, was contained in the Board's annual report for the fiscal year ending June 30, 1904 (p. 3671), and is therefore not repeated herein.

In its last annual report the membership of the Board on June 30, 1907, as constituted for consideration of all improvements other than the Ohio River, was recorded as follows: Col. D. W. Lockwood, Col. R. L. Hoxie, Maj. E. Eveleth Winslow, Maj. Chester Harding, and Capt. William J. Barden.

Since June 30, 1907, the following changes have occurred in the personnel of the Board:

July 17, 1907, by Special Orders, No. 30, Office of the Chief of Engineers, Maj. Harry F. Hodges was detailed as a member of the Board, vice Maj. Chester Harding, thereby relieved.

November 15, 1907, by Special Orders, No. 48, Office of the Chief of Engineers, Lieut. Col. Walter L. Fisk was detailed as a member of the Board during the consideration of the preliminary examination or survey of Pepperells Cove, Maine, relieving Col. Richard L. Hoxie during the consideration of the subject mentioned.

January 3, 1908, by Special Orders, No. 1, Office of the Chief of Engineers, Lieut. Col. Smith S. Leach was detailed as a member of the Board during the consideration of the preliminary examinations or surveys on the Pacific coast, vice Lieut. Col. Harry F. Hodges, temporarily relieved from duty as a member of the Board during the consideration of the subjects indicated.

January 17, 1908, by Special Orders, No. 2, Office of the Chief of Engineers, Lieutenant-Colonel Fisk was relieved from his temporary detail as a member of the Board.

June 25, 1908, by Special Orders, No. 20, Office of the Chief of Engineers, Lieut. Col. Harry F. Hodges was relieved from duty as a member of the Board.

On June 30, 1908, the Board was constituted as follows: Col. D. W. Lockwood, Col. R. L. Hoxie, Maj. E. Eveleth Winslow, and Capt. William J. Barden, and Lieut. Col. Smith S. Leach, during consideration of matters on the Pacific coast.

As stated in the last annual report, the personnel of the Board for the consideration and review of the report on the Ohio River only was as follows: Col. H. M. Adams, Col. Charles E. L. B. Davis, Col. R. L. Hoxie, Lieut. Col. C. McD. Townsend, and Maj. E. Eveleth Winslow. Consideration of this subject was concluded on October 18, 1907, when the Board submitted its report to the Chief of Engineers and adjourned sine die.

At the close of the preceding fiscal year the Board had taken final action on all of the 156 preliminary examinations ordered by the act of March 3, 1905, and had entered upon the consideration of the preliminary examinations ordered by the act of March 2, 1907, numbering 183 in all, exclusive of 17 miscellaneous investigations provided for in section 1 of that act. By June 30, 1908, all reports on the regular preliminary examinations of that act had been received by the Board. The following summary indicates the action taken and recommendations made by district officers and by the Board in reference to the 181 cases on which the Board had taken preliminary or final action at the close of the year:

Favorable reports by district officers on preliminary examinations	115
Favorable reports by Board on preliminary examinations	109
Unfavorable reports by district officers on preliminary examinations	66
Unfavorable reports by Board on preliminary examinations	72
Cost of surveys recommended by district officers	$158,555.00
Cost of surveys recommended by Board	121,732.50
Difference	36,822.50

Of the surveys and estimates made in extension of the preliminary examinations favorably reported upon, 34 were outstanding at the close of the year and 7 were under consideration. With these 41 surveys and estimates and 2 preliminary examinations still to be acted upon, it is not practicable to submit a statement of the expenditures involved in recommendations made on the investigations ordered by the act of March 2, 1907, similar to that contained in the last annual report with reference to the act of March 3, 1905.

Of the 17 miscellaneous cases provided for in section 1 of the act of March 2, 1907, 11 had been received up to the close of the fiscal year, of which 10 had been disposed of and 1 was under consideration.

In compliance with resolutions of the Committee on Rivers and Harbors of the House of Representatives and instructions from the Chief of Engineers, the Board gave consideration to the following subjects during the fiscal year 1908:

Charlotte Harbor, Fla.
St. Petersburg Harbor, Fla.
Olympia Harbor, Wash.
Columbia River from Bridgeport to Kettle Falls, Wash.
Gulfport Channel and Harbor, Ship Island Pass between Ship and Cat islands.
Monterey Harbor, Cal.
Harlem Kills, N. Y.
Atchafalaya Bay, La.
Inland Waterway, from the Rio Grande to the Mississippi.
Galveston Bay channels, Tex.
Tennessee River at Muscle Shoals.
Youghiogheny River, Pa.
Hackensack River, N. J.
Caloosahatchee River, Fla.
Clinch River, Tenn.

Reports have been submitted on 7 of the above subjects, the 8 last named being now under consideration.

In compliance with requests from the Committee on Commerce of the Senate, the Board has under consideration the following subjects:

Little River, Del.
Ship Channel from Sabine and Neches rivers to Taylors Bayou, Tex.

In connection with the various subjects referred to it for report and recommendation, the Board gave public hearings to interested parties and made inspections as follows:

At Pedricktown, N. J., on August 8, 1907, in reference to Oldmans Creek. An inspection was made of the locality.

At Pittsburg, Pa., on August 12, 1907, in reference to the canalization of the Ohio River. An inspection was made of the entire river from Pittsburg to Cairo.

At Portsmouth, N. H., on November 21, 1907, in reference to Pepperells Cove, Me. An inspection was made of the locality.

At San Pedro, Cal., on January 14, 1908, with reference to Wilmington Harbor and San Pedro breakwater. The localities were inspected.

At Monterey, Cal., on January 15, 1908, an inspection was made of Monterey Harbor, no public hearing being deemed necessary.

At Stockton, Cal., on January 18, 1908, in reference to the San Joaquin River and its tributary, Stockton channel, from San Francisco Bay to Stockton. An inspection was made of the locality.

At Sacramento, Cal., on January 20, 1908, in reference to Sacramento River, from its mouth to Feather River. The river was inspected.

At Tacoma, Wash., on January 23, 1908, in reference to the Puyallup River. The river was inspected.

At Olympia, Wash., on January 24, 1908, in reference to Olympia Harbor. The harbor was inspected.

At Everett, Wash., on January 25, 1908, in reference to Snohomish River, from the mouth to Lowell. An inspection was made of the locality.

At Point Judith, R. I., on March 24, 1908, an inspection was made of Point Judith Harbor of Refuge.

At Little Creek, Del., on April 15, 1908, in reference to Little River. The river was inspected.

At Port Jervis, N. Y., on June 3, 1908, in reference to Neversink River, or the Delaware River at or near the mouth of the Neversink. An inspection was made of the locality.

On June 16, 1908, an inspection was made of Bayou Terrebonne and connecting waterways from New Orleans to Bayou Caillou, during which representatives of the locality were heard.

On June 17, 1908, an inspection was made of Atchafalaya Bay, La., and interested parties were heard en route.

At Lake Charles, La., on June 18, 1908, with reference to the inland waterway from the Rio Grande River, Texas., to a connection with the Mississippi River.

At Galveston, Tex., on June 19 and 20, 1908, in reference to Galveston Bay channels; the inland waterway from the Rio Grande River, Texas, to a connection with the Mississippi River; Colorado River; Pass Cavallo to Port O'Connor, and Arroyo Colorado. An inspection was made of the several channels of Galveston Bay.

On June 21, 1908, an inspection was made of the mouth of Brazos River.

On June 22, 1908, an inspection was made of the ship channel from the mouths of the Neches and Sabine rivers to Taylors Bayou in Jefferson County, Tex., during which the committee of the Board was accompanied by representatives of the locality, who were heard in relation to the improvement.

Forty-seven informal hearings to members of Congress and other interested persons were held at the office of the Board in relation to the following subjects:

July 22, 1907, Potomac River, channel to Mount Vernon, Va.
July 22, 1907, Hillsboro Bay, Fla.
July 29, 1907, Oldmans Creek, N. J.

August 19, 1907, Gulfport and Ship Island Pass, Miss.
August 19, 1907, Arthur Kill, at Buckwheat Island, N. Y.
September 9, 1907, Estero Bay and St. Petersburg Harbor, Fla.
September 16, 1907, Little River, N. C.
September 23, 1907, Caddo Lake, Tex.
September 23, 1907, North Fork, Edisto River, S. C.
October 7, 1907, Potomac River, at Lower Cedar Point, Md.
November 18, 1907, Youghiogheny River, Pa.
November 25, 1907, Texas City Channel, Tex.
December 2, 1907, Shallow Bag Bay, N. C.
December 9, 1907, New River and White Oak River, N. C.
December 9, 1907, Saline River, Ark.
December 9, 1907, Maumee River, Ohio.
December 16, 1907, Gary Harbor, Ind.
December 16, 1907, North Fork, Edisto River, N. C.
December 23, 1907, Munising Harbor, Mich.
December 23, 1907, Bayou Courtableau, La.
December 23, 1907, Biloxi Harbor, Miss.
December 30, 1907, Saint Andrews Bay, Fla.
January 13, 1908, Saint Lucia Inlet, Fla.
January 22, 1908, Plymouth Harbor, Mass.
January 31, 1908, Cowlitz River, Wash.
February 17, 1908, Ogdensburg Harbor, N. Y.
February 24, 1908, Indiana Harbor, Ind.
March 2, 1908, Northwest Fork, Nanticoke River, Md.
March 9, 1908, Point Judith Harbor of Refuge, R. I.
March 9, 1908, Big Sunflower River, Bear Creek, and Roebuck Lake, Miss.
March 9, 1908, Ship channel connecting Puget Sound with Lakes Union and Washington.
March 9, 1908, Tuckahoe River, Md.
March 16, 1908, Saint Andrews Bay, Fla.
March 23, 1908, South Fork, Forked Deer River, Tenn.
March 23, 1908, Colorado River, Tex.
March 23, 1908, Saint Marks River, Fla.
March 23, 1908, Vermilion Bayou, La.
March 28, 1908, Atchafalaya Bay, La.
April 6, 1908, Cape Fear River above Wilmington, N. C.
April 6, 1908, Colorado River, Tex.
April 6, 1908, Mouth of Brazos River, Tex.
April 6, 1908, Saline River, Ark.
April 27, 1908, Hillsboro Bay, Fla.
May 11, 1908, Neversink River, N. Y.
May 11, 1908, Arroyo Colorado, Tex.
May 18, 1908, Missouri River, from mouth to Kansas City and from Kansas City to Sioux City.
May 25, 1908, Hillsboro Bay, Fla.

Expenses of the Board during the fiscal year may be briefly summarized as follows:

Rent of offices	$1,440.00
Salaries of civilian assistants	5,562.50
Mileage and traveling expenses	4,508.67
Miscellaneous	168.01
Total	11,679.18

For the Board:
Very respectfully,

D. W. LOCKWOOD,
Colonel, Corps of Engineers,
Senior Member of the Board.

The CHIEF OF ENGINEERS, U. S. ARMY.

APPENDIX C C C.

SUPERVISION OF THE HARBOR OF NEW YORK.

REPORT OF CAPT. AARON WARD, U. S. NAVY, SUPERVISOR, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

WAR DEPARTMENT,
OFFICE OF THE SUPERVISOR
OF THE HARBOR OF NEW YORK,
New York, July 14, 1908.

SIR: I have the honor to submit the following report of the operations of this office for the fiscal year ending June 30, 1908, and an estimate of amount of funds required for the fiscal year ending June 30, 1910.

On May 14 last I assumed charge as supervisor of the harbor of New York, relieving Lieut. D. C. Hanrahan, U. S. Navy, who had been temporarily in charge since the death in office of Commander H. H. Hosley, U. S. Navy, January 6, 1908.

In the death of Commander Hosley the service lost a most capable and reliable officer, who regarded the commercial interests of this great harbor as of national importance. I heartily indorse and reiterate all of the recommendations set forth in his last annual report.

The current fiscal year being so nearly ended when I assumed charge, I can only submit a report of operations of this office as shown by the records and a brief personal observation.

In compiling the report it has been found necessary to go a little further into detail than usual, in order that the work accomplished, the great amount of work yet to be done, and the requirements of the office may be clearly stated.

The object is to protect the channels of the harbor and tributary waters, together with those of Long Island Sound, from violations of the law prohibiting the deposit of any injurious or obstructive material in these waters, and to enforce the provisions of the act of Congress approved August 18, 1894, in keeping the main channels free from small craft engaged in fishing or dredging for shellfish, or in any way interfering with the safe navigation of those channels by ocean steamships and vessels of deep draft.

In view of the large expenditure of public money in the improvement and maintenance of these channels, it is a decidedly economical measure to provide sufficient funds for the maintenance of an efficient force for their preservation. The system at present in operation is an effective and constant patrol of the waters of the harbor, checking

reports of scows and dumpers and the final disposition of their contents by means of reports of loading, permits issued, and reports of material received and disposed of. This system has been gradually expanding and improving until it is now almost impossible to dispose of any waste material in the waters of the bay and harbor without the knowledge of this office. To prove effective, four vessels must be utilized in maintaining a permanent patrol of the bay and harbor as far out at sea 2 miles south and east of Scotland light-ship, this being the present designated point at which the deposit of any dredging spoils or waste material may take place at the mouth of the harbor, except so far as relates to the disposition of material dredged from the Ambrose or other channels by the United States operating dredges under United States Army engineer officers. Such deposits are made in an average depth of 85 feet in the neighborhood of Scotland light-ship, or such other point near the mouth of the harbor as may seem best to the interests of the United States by the engineer officer in charge, the amount so deposited being 6,150,369 cubic yards during the past year. This amount, added to that deposited by private contractors under the United States engaged in improving the channels, dredging spoils from improvements along the water fronts of Manhattan, Brooklyn, and New Jersey, tunnel excavations, and débris from excavations and the razing of old buildings, technically known as "cellar dirt," amounting to 5,981,845 cubic yards, gives an aggregate of approximately 12,132,214 cubic yards deposited during the past year at the mouth of the harbor. The transportation of this large amount of absolutely waste material upon the waters of the harbor to the point of final disposition at sea involves a towage varying from 25 to 40 miles. This long tour through the channels and in weather more or less uncertain, making the towage bills heavy and the cost of improvements much greater than they would be were it possible to avoid towing the spoils so far, is a powerful incentive for crafty tug masters to resort to every possible means to circumvent the inspectors in their duties in carrying out the law. The vessels employed on this duty must be kept in good, serviceable condition, capable at all times of following the tows to sea under all conditions of weather when tows can venture out. The masters of the towboats keep themselves well informed of the seaworthy qualities of the vessels on patrol duty and govern themselves accordingly.

The channels of the lower bay are long and narrow, with water barely sufficient for large vessels. To keep these channels open and free for navigation requires very careful and vigilant work by the patrol vessels. It seems to be pretty well known by those familiar with the harbor that should the patrol be suspended for but a few months New York Harbor would be inaccessible to the larger of the trans-Atlantic steamers. A permanent and efficient patrol of the mouth of the harbor day and night is therefore absolutely imperative. There can be no doubt as to the economy in the maintenance of such a service.

On assuming charge I found six steam tugs and one naphtha launch, and as the jurisdiction of the office comprises the waters of the Hudson River as far as Troy, Long Island Sound, Newark Bay, and New York Bay and Harbor and tributary waters thereto, this seems truly a small force when the large territory placed under the jurisdiction of the office is considered.

This force is utilized as follows: Four tugs keep permanent patrol of the mouth of the harbor day and night, one inside the Narrows collecting the permits, inspecting the tows, and keeping them under surveillance until they are taken up by the vessel on the outside patrol in the neighborhood of the designated point for deposit. The tugs *Cerberus*, *Lamont*, *Scout*, and *Nimrod* are employed on this duty.

The first three vessels are in good, serviceable condition, while the *Nimrod*, an old wooden vessel, on which the full amount appropriated under allotment "Reconstructing hull and overhauling steam tug *Nimrod*, $5,000" has been expended, is still structurally weak and in a poor seaworthy condition. The *Nimrod* has therefore been utilized mainly for duty inside the Narrows, and may, with careful running, last the year out.

I earnestly concur in the recommendation of my predecessor, Commander Hosley, that an appropriation of $50,000 may be allowed for the purchase or construction of a vessel to replace the *Nimrod*. Such a boat, if appropriated for, would not be available for at least eighteen months. By that time the retiring of the *Nimrod* from sea service will have become imperative. She could then, however, be utilized as a patrol vessel on the Sound, which will be a necessity in the near future, owing to the great improvements now under operation or in contemplation along the north shore of Long Island. Since the New York State laws prohibit the deposit of any material in the waters of the Sound west of Eaton's Neck, the final disposition of dredging spoils from points along that shore must necessarily take place to the eastward of that point. It would prove prohibitive of all development or improvement to require the constantly increasing quantities of waste material from these points to be deposited at the established dumping ground outside Scotland light-ship; and although permits are granted by this office at present for the final disposition of dredging spoils from small operations at the point named, the supervision is only spasmodic and ineffective, owing to the limited force at the disposal of the supervisor. As the operations in dredging and channel making increase, the necessity for a more rigid supervision in that locality is yearly becoming more apparent.

The *Argus* is very old and has been used as a spare boat, in charge of a shipkeeper, to take the place of such vessels as may have broken down and gone under repair; but service by this vessel is absolutely unreliable and is but a makeshift at best. I therefore recommend that she be sold upon the replacing of the *Nimrod* by a new vessel.

The *Vigilant* is utilized in general cruising, making regular daily inspections along the water fronts, and such special inspections of points where dredging plants or works of filling in or reclaiming land are in operation within the limits of jurisdiction. This vessel's hull is in excellent condition, but her boilers and engines are in a wretched state, requiring continual tinkering and patching to keep them serviceable. It would have been economy to have replaced both at this time, as recommended by my predecessor. A recent collision with the Mallory Line steamer *Nueces* (at anchor), and consequent claim for damages, was probably due to defects in this machinery, which can no longer be satisfactorily repaired. I therefore urgently recommend that the sum of $15,000, as submitted in my estimate for the next fiscal year, may be appropriated for that purpose.

The naphtha launch *Lookout* is in fair condition. Its district includes Staten Island Kills, Newark Bay, Passaic River, and various shallow tributaries. This little vessel is also very useful in investigating points along shore where pier building or excavating operations are under way, or in other special investigations where the water is insufficient for the larger vessels. She needs a new naphtha engine, the present one being past the point of much further repair.

In the course of performing their duties the patrol vessels have during the past year frequently rendered important and valuable services in the saving of life and property. The letters of thanks received by this office are filed in the records to the credit of the vessel rendering the assistance.

I particularly desire to direct attention to the fact that although the number of patrol vessels seems adequate, two, as above stated, are now so old and worn out as to be almost useless. Although the necessities are such as to require these boats to be kept in service, this is only attained by expenditures for temporary patching and repairs, which are not economical. Any large expenditure on one vessel from the general allotment tends to the running down of all, and to tinkering and patching where a thorough overhauling and repairing are required.

The laying off of one boat merely places extra duty on the remaining vessels and taxes them with such severe service that the continued temporary patching of all is the inevitable result. It is therefore to be regretted that the recommendations and estimates as submitted by my predecessor did not meet with favorable action, as the demands likely to be made on the general allotment for temporary repairs to the older vessels will make it extremely difficult for this office to maintain the patrol in serviceable condition to the close of the fiscal year.

A great source of trouble experienced by this office arises from masters of towboats proceeding to sea in unfavorable weather. On frequent occasions masters of towboats display exceedingly poor judgment in taking unnecesary risks and continuing toward the dumping ground during the prevalence of bad weather. This often results in the discharge of a portion or the whole of the cargo of the scows to prevent their sinking in the heavy seas which break over them, threatening disaster to the tow and greatly hazarding the lives of the scow men. Such cases, however, are not always due to poor judgment on the part of the master; their position is a most responsible one, and there is every incentive for them to take big risks, as their owners place them in the very awkward position of going out or losing their command. As a result, tows go out at times when the masters know it is not prudent, but under the circumstances they have the feeling that if they do not take the tows out, some other man will. So the start is made, and when one tow starts out, the others usually follow, being actuated by the knowledge that their employment is at stake. Several cases of this nature have been referred to the United States district attorney for prosecution during the past year, notably that against the Port Johnson Towing Company. (See synopsis and status of cases of illegal dumping referred for prosecution.) These cases demonstrate the necessity for the drastic measures passed by Congress for the protection of the channels, and now

thoroughly established by numerous trials and decisions of cases in the United States courts.

Owners of plants and tugboats and others interested now realize their responsibility and feel that they must exercise every precaution to insure the safe deposit of the material at the designated point, or suffer the inevitable consequences, viz, withholding payment for material not disposed of in accordance with law, fine, or imprisonment. Any modification of the existing law by which owners or contractors may evade responsibility would therefore be inimical to the best interests of the Government by hazarding the commercial interests of the port. The law, although stringent, is not unjust; and as it is now fully established, the expenditures of the Government in its enforcement are reduced to the maintenance of a competent patrol system.

A gradual extension of the limits within which the deposit of waste material must not take place has been the policy of this office for some years back, thus materially increasing the cost of towage, and, by increasing vigilance on the part of the patrol force in compelling a strict compliance with the law and regulations governing the deposit of such material, encouraging some other preferable method of final disposition than at the mouth of the harbor. However, the limit now extends to a point as far out at sea as vessels usually employed in that service can venture with safety.

It is particularly satisfactory to note the increasing utilization of material for filling in behind bulkheads and reclaiming land. A great portion of the city's street sweepings have been utilized in reclaiming land and enlarging Rikers Island, while a portion of the same have been sent to Newark Bay, Staten Island Sound, and other nearby places and used for filling in. A large amount of material has been utilized at Governors Island and the new freight terminals of the Pennsylvania Railroad at Harrison, N. J. Much of the dredgings arising through deepening of the Passaic River is made use of on the swamp lands to the westward of Newark Bay.

The present designated dumping ground at the mouth of the harbor, southeast of Scotland light-ship, has been used since December 1, 1903. Numerous soundings—about every three months—have been taken by the patrol boats without showing any appreciable shoaling, and care is being taken to preserve plenty of water in that vicinity. However, as soon as the dredging of Coney Island channel to a depth and width sufficient for tows is completed, it is contemplated to move the point for such deposits to a point well to the northward and eastward of Sandy Hook light-ship. These tows would then use that channel almost exclusively, thereby relieving the main channels of the lower bay to a large extent.

During the past year much attention has been directed to the disposal of ashes from tugs and other harbor craft. Two additional scows have recently been added to those already located in the harbor for the reception of ashes from small craft, making a total of nine scows furnished by the city authorities under section 880 of the charter of Greater New York, distributed about the harbor at the most convenient and accessible locations. Ample facilities seem therefore to be furnished to make it easy for the harbor craft to get rid of their ashes, and as a result there is less evasion of the law in

this respect than in former years. These ashes, amounting to about 50,000 cubic yards during the past year, were utilized in filling behind bulkheads. Nevertheless, these small craft require much attention. Violations are still frequently reported, though as quickly remedied by a sharp letter of warning to the owner, which generally results in a disciplining of the crew and precautions being adopted to prevent recurrence. The offense, while trifling in individual instances, would in the aggregate speedily become a serious matter, more especially in the shallow waters of the Kills, Newark Bay, and tributaries.

It is to be regretted that, even with the stringent laws now in force and the methods of supervision and checking prevalent, a small amount of material finds its way to the channels, due largely to defective dumpers; but it is invariably detected. Such cases, being of a minor or technical nature, can not well be referred to the courts because of lack of sufficient evidence to warrant such expensive procedure, and are met by this office advising the party for whom the work is being done that the material so illegally disposed of had not been deposited in accordance with the terms of their contract, and suggesting that the amount thereof be deducted from the contractor before payment is made. The same action is taken in cases of material failing to clear at the proper point for deposit, due to defective machinery or refractory material, which must be accounted for by the contractor, either by return to the point of loading to be there measured and proper deduction made, or disposed of under a new permit.

There are also many cases where, for reasons as stated, dumpers fail to clear and the material must be returned to the harbor, as it has been found impracticable to require the tows to remain on the dumping ground indefinitely. Since it is a physical impossibility to wind up the dumper doors perfectly tight after once being opened, more or less of the material is found to leak out, in some cases the entire load clearing before entering the Narrows, due probably to the action of the eddies, especially where vessels comprising the tow are turned end for end. However, contractors being now fully aware that they will not get paid for any material thus lost in transit, every effort on the part of the masters of tows is now made to clear the loads before leaving the dumping ground. The following table shows deductions made on contracts for material escaping from dumpers while in transit or otherwise improperly disposed of or unaccounted for:

	Cubic yards.
United States Engineer Department	8,539
Department of docks and ferries	200
Private contracts	881
Total	9,620

at an estimated average of 35 cents per cubic yard, amounting to $3,367.

Under the same contracts 57½ pocket loads (averaging 150 cubic yards each, or a total of 8,625 cubic yards) were noted by the patrol boats as failing to clear at the proper point outside Scotland lightship and were kept under surveillance until returned to the original point of loading. This amount of material would have proved a large item of gain to the contractors could it have been disposed of

on the way in without the knowledge of this office and before reaching the supervision of the parties for whom the work was done, the contractor not only having to bear the expense of retowing it to sea, but very frequently having to redredge it before being able properly to dispose of it.

Much attention has been given by this office to the menace to navigation due to floating logs and timbers, the vessels of this office as well as others having been sufferers from this source to the extent of several propeller wheels, and efforts made to put a stop to or mitigate the evil. In all cases where wharves or docks, involving the removing of old cribwork and spiles, are under construction the contractor is required to have a sufficient force on boats to secure such logs as may be brought to the surface. As these logs are of no value, great difficulty is experienced by the contractor in disposing of them, and as the deposit of such material at the mouth of the harbor is positively forbidden by this office, there is much temptation to secure them with rotten lines, etc., necessitating a strict surveillance over such work by the force of this office. It has been found, however, that many of these timbers are permitted to get adrift or are washed off shore by freshets or tides and find their way to the upper and lower bays, floating in and out with the tides, therefore much difficulty is experienced in identification.

The following is a synopsis of cases settled or still pending:

CASE AGAINST THE TUG H. G. RUNKLE.

[Willis G. Hill, master; Andrew Hansen, scowman.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1905, Appendix Z Z, page 2579.

December 7, 1904: Warrant issued.
June 30, 1908: Case pending. (F. 46/7.)

CASE AGAINST THE TUG O. L. HALENBECK.

[A. H. Hastorf, owner of dumpers; Peter Cahill, owner of tug; John D. Sjolund, master; Antonio Samuels and Charles Gose, scowmen.]

A synopsis of this case appeared in the Annual Report of the Chief of Engineers for 1907, Appendix D D D, page 2251.

September 17, 1906: Warrant issued.
November 19, 1906: Defendants held to await action of grand jury in eastern district of New York.
December 30, 1907: Indictments filed against Charles Gose and John Sjolund under section 11 of act of June 13, 1902.
April 28, 1908: John Sjolund fined $15. Fine paid. (F. 46/21.)

CASE AGAINST THE TUG ROBERT M. DUY.

[William Stebbins, master; Julius Anderson and Alexander Holme, scowmen.]

A permit was issued upon the application of the Du Bois Brothers Dredging Company for the tug *Robert M. Duy* to tow dumpers loaded with material dredged from Tarrytown Harbor, New York, under contract with United States Government, to a point in the

middle of the Hudson River off Stony Point light-house, and there deposit it in not less than 15 fathoms of water.

It being intimated that these deposits were not being made in accordance with the terms of the permit, Lieut. D. C. Hanrahan, U. S. Navy, then assistant supervisor, was detailed to inspect the operations, the naphtha launch *Lookout*, with Deputy Inspector O'Mara in charge, being placed at his disposal.

At about 5.20 p. m. of September 30, 1907, scows *R. R. 4* and *R. R. 5* were found fully loaded and moored to a mooring scow about a quarter of a mile from shore. At about 1.45 a. m. October 1, 1907, the tug *Robert M. Duy* was observed moving around scows without lights, and at about 2 a. m. both scows were seen to rise well up in the water. Inspectors went alongside and found both empty, the scowmen stating that the master of the tug ordered them to knock out the pawls and dump the loads. The spot where the material was illegally deposited was about one-half mile southwest from Tarrytown wharves, on east edge of channel. As this was clearly a case of intentional and willful violation of law, the master of the tug and the scowmen were placed under arrest, and the case referred to the United States district attorney for the southern district of New York for prosecution of the parties liable.

November 1, 1907: Indictment filed.
November 4, 1907: Holme pleaded guilty; sentence suspended.
December 12, 1907: Stebbins pleaded guilty; fined $250; fine paid. Nolle pros as to Anderson. (C. 21.)

CASE AGAINST THE TUG M. MORAN.

[A. Walling, master; Charles Layarte and George Bonehette, scowmen.]

This tug proceeded to sea with dumpers *Nos. 3 S* and *4 S* fully loaded with mud, passing the fort bound out about 5.15 a. m. of October 29, 1907. At about 7.15 a. m., when at a point about one-half mile northwest of the buoy on Palestine shoal, the contents of both dumpers were illegally deposited, the violation being witnessed by the patrol boat *Nimrod* (John Benvenue, master). The weather at the time was clear, with a brisk wind from the north accompanied by a short choppy sea. The master of the towboat and the scowmen were placed under arrest and the case referred to the United States district attorney for the southern district of New York for prosecution of the parties liable.

March term, 1908: Presented to grand jury. Jury failed to indict. (C. 22.)

CASE AGAINST THE TUG BOUKER NO. 2.

[Bouker Contracting Company, owner; Frealon Briggs, master; John Lonzo and Lewis Ferrei, scowmen.]

This tug proceeded to sea with two dumpers, *Nos. 11 H* and *12 H*, fully loaded with mud, passing the Narrows bound out about 10.20 a. m., November 7, 1907; the weather cloudy, wind northwest, sea rough. This tow was making very bad weather and was kept under surveillance by the patrol boat *Scout* (Charles Bell, master). When the tow reached a point about one-eighth of a mile north of the bell buoy of the middle at about 11.35 a. m., the scowman on *No. 11 H* was seen to knock out and dump the contents of four pockets; and

while the tow was abreast of Romer light in the Swash channel at about 11.50 a. m., the scowman on *No. 12 H* knocked out and dumped the contents of two pockets. The tow continued to the designated dumping ground outside Scotland light-ship, where the remainder of the loads were legally disposed of. After thorough investigation, the case was referred to the United States district attorney for the southern district of New York for prosecution of the parties liable.

December 10, 1907: Indictment filed.

December 31, 1907: All defendants pleaded guilty. Bouker Contracting Company and Frealon Briggs fined $250. Fine paid. Sentence suspended as to Lonzo and Lewis Ferrel. (C. 23.)

CASE AGAINST THE TUG JULIA C. MORAN.

[Moran Towing and Transportation Company, owners; Robert Moon, master.]

This tug passed out to sea with dumpers *Sea Bird* and *R. R. No. 1* fully loaded with cellar dirt at about 12.25 a. m. of November 11, 1907, arriving at the light-ship about 3.30 a. m. of that date, having the dumper *Sea Bird* only in tow, dumper *R. R. No. 1* evidently having been dropped from the tow and eventually picked up light about 6 a. m. in the vicinity of buoy No. 4, Ambrose channel. The scowman of *R. R. No. 1*, Alexander Holme, stated that he did not know where he was after breaking adrift and dumped the contents to save himself and the scow. As no efforts appeared to have been made by the master of the towboat to recover the scow and prevent the illegal discharge of her contents, and as it did not seem clear to this office that part of the tow had broken adrift without his knowledge, the case was referred to the United States district attorney for such action as he might deem advisable.

December 10, 1907: Moran Towing and Transportation Company and Robert Moon pleaded not guilty.

December 18, 1907: Case tried, and indictment dismissed by the court. (C. 24.)

CASE AGAINST THE TUG FRANKLIN N. BROWN.

[John Erickson, master; Domine Varrar and James Rich, scowmen.]

This tug passed the fort bound out, about 11.15 a. m., March 18, 1908, having in tow dumpers *No. 23 E* and *Ward E* fully loaded with cellar dirt. The tow was inspected by the patrol boat *Scout* (Charles Bell, master) while passing the Romer light and both dumpers found fully loaded. This tow was kept under surveillance, and on reaching the outer Fairway buoy in the south channel at about 2 p. m. the scowman on *No. 23 E* was seen to knock out the after middle pocket, the contents being illegally deposited in the channel about 200 feet east of that point. At about 2.10 p. m., the scowman on *Ward E* knocked out the second forward and second after pockets, the contents being illegally deposited at a point about one-half mile northwest of the light-ship. The weather during the trip was high east wind, rough sea, raining and fog.

As it was the opinion of this office that the scows were lightened for the purpose of making better weather and that the master of the tow should not have ventured to sea under the conditions of weather then prevailing, the case was referred to the district attorney for his action.

Case ignored by grand jury at March term, 1908. (C 25.)

CASE AGAINST THE TUG P. J. T. CO. NO. 7.

[Thomas Clark, master; the Morris and Cumings Dredging Company, owners of dumpers.]

This tug proceeded to sea with two dumpers, *Nos. 40 M* and *41 M*, loaded with material dredged from Coney Island channel, passing the lump buoy bound out about 8 a. m. of September 18, 1907. When at about one-half mile southeast of that point both scows broke adrift, dumping their contents in the channel, the scowmen being rescued by the patrol boat *Scout* (Charles Bell, master) after much risk and difficulty. The weather during this trip shows strong ESE. wind, with a heavy rough sea running.

As in the opinion of the supervisor the master of this tow showed excessively poor judgment in attempting to reach the light-ship in the face of the weather then prevailing, the case was referred to the United States district attorney with a recommendation that proceedings be instituted with a view to the prosecution of the parties liable. The facts and copies of all papers in the case were also referred to the supervising inspector, second district, Steamboat-Inspection Service, recommending that some action in the cause of humanity might be taken by the Department, as it was believed a short suspension of license in these cases would do much to prevent towboat masters proceeding to sea in the face of such weather as would imperil the lives of the scowmen. This case was tried before the Steamboat-Inspection Board with the following decision: "Charge not proven such as to warrant action against the license of the pilot in charge."

The following copies of correspondence show the final disposition of this case:

DEPARTMENT OF JUSTICE,
OFFICE OF THE UNITED STATES ATTORNEY
FOR THE SOUTHERN DISTRICT OF NEW YORK,
New York, May 9, 1908.

The SUPERVISOR OF THE HARBOR OF NEW YORK,
39 Whitehall street, New York City.

SIR: I have the honor to refer to the letter of Supervisor Hosley, dated October 10, 1907, and addressed to Mr. O'Brien of this office, in which it is stated that a tug of the Port Johnson Towing Company took scows of the Morris and Cumings Dredging Company down the harbor in bad weather, and that as a result two of the scows capsized, depositing their contents within prohibited limits.

I think that on a trial the defense would probably raise serious doubts in the minds of some of the jurors as to the existence of any criminal negligence, and although the existence of criminal negligence may not be an essential element of the crime charged, yet it will be impossible to prevent this phase of the situation from being presented to the jury and influencing their verdict.

I am of the opinion that there would be a very small chance of procuring a conviction in this case, and that the outcome of a prosecution would be more likely to encourage violations of the law than to discourage them, and therefore think that no prosecution should be brought on this charge.

Respectfully,

H. L. STIMSON, *U. S. Attorney.*

WAR DEPARTMENT,
OFFICE OF THE SUPERVISOR OF THE HARBOR OF NEW YORK,
New York, May 12, 1908.

Hon. H. L. STIMSON,
United States Attorney for the Southern District of New York,
New York City.

SIR: In reply to your letter of the 9th instant (initials C. A. R.) in regard to cases of illegal dumping against the Port Johnson Towing Company and the

Morris and Cumings Dredging Company, I am constrained to concur in your opinion that further action in these cases at this time would be inadvisable, and heartily I agree with you in the statement that the failure of a successful prosecution in these cases would be more likely to encourage violations than to discourage them. It is, however, very much to be regretted that such actions are likely to meet with disaster before a jury who, as a rule, are probably unfamiliar with the conditions governing the transportation and final disposition of waste material at the mouth of the harbor; if it could be impressed upon them that this material is waste from a large city and that masters of tows are more liable to take many more chances in proceeding to sea than if their tows consisted of more valuable material, the doubt as to the existence of criminal negligence might be eliminated.

It will no doubt be apparent to your office that the great difficulty this office has had to contend with arises from the fact of masters taking chances in proceeding to sea in the face of most unfavorable weather, in many instances losing part or the entire load before reaching the designated point of deposit.

In this connection I concur in the opinion as expressed by my predecessor, that some action is necessary on the part of this office and the courts to deter these masters from taking unnecessary chances; in this manner preventing further injury to the channels of the harbor, for which the Federal Government has expended and is expending annually large appropriations for improvements and maintenance; as, although individual cases may not materially injure the channels, in the aggregate they become a very serious matter, being largely due, as I have previously stated, to the masters of the tows proceeding to sea disregarding entirely the conditions of weather prevailing and the seaworthiness of the vessels comprising their tows, taking the chances in the interest of their owners. Unfortunately the master who displays the better judgment and remains in a lee until the storm has passed will probably meet with the censure of his owners because of the fact that another tow had taken the risk and got clear of his load, whether to the detriment of the channels or otherwise.

My interest in the protection of the harbor is my apology for the length of this communication, as I desire to put this important phase of illegal dumping as clearly before you as I possibly can.

Very respectfully,

D. C. HANRAHAN,
Lieutenant, U. S. Navy, Supervisor.

CASE AGAINST THE TUG E. F. MORAN.

[Franklin J. M. Walsh, master; The Moran Towing and Transportation Company, owners.]

This was a case in which the master of the towboat claimed to have passed to sea on the night of November 3, 1907, with two dumpers, *Nos. 5 S* and *12 S*, fully loaded with material dredged from the Passaic River under Government contract, but was not seen by the patrol vessels on duty.

Upon investigation the master of the towboat claimed he had passed out that night, but having trouble with his dynamo had probably escaped the notice of the patrol vessels. As this excuse for running without lights appeared absurd in view of the fact that it would not apply to the vessels comprising his tow, the matter was deemed of sufficient importance to refer to the United States supervising inspector of steam vessels for such action as might be deemed proper. The case was tried before the New Haven board of the United States Steamboat-Inspection Service November 18, 1907, and decision rendered November 23, 1907.

Decision: Specifications proven and the license of the accused suspended for thirty days. (C. 45.)

During the fiscal year ending June 30, 1908, 22,952,563 cubic yards of material—mud, sand, city refuse, garbage, cellar dirt, ashes, lime, and other material—have been moved and deposited outside the har-

bor at properly designated places and behind bulkheads in the neighborhood of New York, as per the following recapitulation:

Place of deposit.	Kind of material.	Amount.
		Cubic yards.
Mouth of harbor, outside Scotland light-ship	Mud, sand, city refuse, etc	12,132,214
Long Island Sound	Mud, shells, etc	1,160,497
Fishers Island Sound	do	56,668
Hudson River	Mud, dirt, ashes, etc., behind bulkheads and on shore for filling.	670,996
Harlem River	do	12,700
East River	do	1,685,944
Shrewsbury River	do	27,825
Passaic River	do	1,780,405
Raritan River	do	57,929
Hackensack River	do	482,156
South River	do	84,483
Elizabeth River	do	20,138
Staten Island Sound	do	76,310
Newark Bay	do	365,734
New York Bay	do	2,647,229
New York Bay (Pennsylvania Railroad, Greenville).	do	400,200
New York Bay (Central Railroad Company of New Jersey, Port Liberty).	do	1,071,580
Barren Island	Garbage, dead animals, etc., on shore for reduction.	219,605
Total		22,952,563

Permits issued	9,487
Average number of tows daily to sea	16
Average number of scows daily to sea	32

From the foregoing statement it will be seen that 12,132,214 cubic yards of mud, street sweepings, cellar dirt, etc., were deposited near the mouth of the harbor; 1,160,497 cubic yards of dredging spoils deposited in Long Island Sound, a small percentage of which—principally sand and shells—was utilized for the propagation of oysters, being scattered over oyster beds under supervision of the shell fish commission of the State of Connecticut; 56,668 cubic yards of mud, etc., deposited in Fishers Island Sound; 9,383,579 cubic yards of cellar dirt, ashes, and other inoffensive material were used for filling in behind bulkheads, and 219,605 cubic yards of garbage, dead animals, offal, etc., were deposited on Barren Island for reduction.

The following is a statement of the appropriation for "prevention of deposits, harbor of New York, 1908:"

For pay of inspectors, deputy inspectors, office force, and expenses of office		$10,260.00	
Expended to June 30, 1908	$10,138.37		
Outstanding liabilities	115.80		
		10,254.17	
			$5.83
For pay of crews and maintenance of six steam tugs and one launch		75,000.00	
Expended to June 30, 1908	$71,636.03		
Outstanding liabilities	3,313.03		
		74,949.06	
			50.94
For reconstructing hull and overhauling steam tug *Nimrod*		5,000.00	
Expended to June 30, 1908		5,000.00	
Balance			56.77

The following is an estimate of appropriation required for service of the fiscal year ending June 30, 1910, by the supervisor of the harbor:

Detailed objects of expenditure and explanations.	Estimated amount that will be required for each object.	Amount appropriated for fiscal year ending June 30, 1909.
Prevention of obstructive and injurious deposits within the harbor and adjacent waters of New York City:		
For pay of inspectors, deputy inspectors, office force, and expenses of office	$10,260	$10,260
For pay of crews and maintenance of patrol fleet	80,000	75,000
Renewing engines and boilers of steam tug Vigilant	15,000	.....
For purchase or construction of one steam tug	50,000	.....
Total	155,260	85,260

Very respectfully, your obedient servant,

AARON WARD,
Captain, U. S. Navy, Supervisor.

The CHIEF OF ENGINEERS, U. S. ARMY.

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APPENDIX D D D.

ANNUAL REPORT OF THE CALIFORNIA DEBRIS COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

CALIFORNIA DÉBRIS COMMISSION,
San Francisco, Cal., June 30, 1908.

SIR: The California Débris Commission has the honor to submit the following annual report for the fiscal year ending June 30, 1908:

The work in charge of the Commission is described in the summary of this report.

REGULATION OF HYDRAULIC MINING.

During the past fiscal year the Commission received 34 applications for permits to mine by the hydraulic process under the requirements of the act of Congress approved March 1, 1893, as amended by the act approved February 27, 1907. During the same period 24 permits to mine by the hydraulic process were granted.

A number of permits were revoked by the Commission during the past year, the miners in such cases having abandoned operations or failed to maintain the impounding works as specified by the Commission. A number of licenses were also temporarily suspended for various causes. Numerous personal inspections of mines and their débris impounding works were made during the year in connection with the work of requiring operators to impound properly the débris resulting from their operations.

Money statement.

APPROPRIATION FOR EXPENSES OF CALIFORNIA DÉBRIS COMMISSION, 1908.

July 1, 1907, amount appropriated by act of Congress approved March 4, 1907	$15,000.00
June 30, 1908, amount expended during fiscal year	[a] 13,557.25
July 1, 1908, balance unexpended	1,442.75
July 1, 1908, outstanding liabilities	1,142.75
July 1, 1908, balance reverting to Treasury	300.00

APPROPRIATION FOR EXPENSES OF CALIFORNIA DÉBRIS COMMISSION, 1909.

Amount appropriated by act of Congress approved May 27, 1908	$15,000.00
Amount (estimated) required for expenses of the California Débris Commission during the fiscal year ending June 30, 1910, in regulating hydraulic mining operations in the State of California, making examinations and surveys for improvement of navigation, control and disposition of mine débris, and control of flood waters, as required by the act of Congress approved March 1, 1893	15,000.00

[a] In addition there was expended during the year $5.96 from appropriation for fiscal year 1906 and $863.75 from appropriation for fiscal year 1907.

retained in making previous payments under the contract of March 29, 1905. Payment of this sum, $2,372.32, was made December 31, 1907, the United States and State of California each paying one-half.

Settling basin.—On April 27, 1908, a contract was entered into with Edward Malley, of San Francisco, Cal., for constructing a portion of the embankment for the proposed settling basin on the south side of the Yuba River near Daguerre Point.

Under this contract it is proposed to construct an earth embankment along 6,770 feet of a portion of the south and west sides of the proposed settling basin. That part of the embankment to be built under the contract is to have a crown width of 10 feet and a slope of 1 vertical on 3 horizontal on the inside, and of 1 vertical on 2 horizontal on the outside of the basin. The crest of the embankment to be built under the present contract is to be at reference 124. This will involve the placing of approximately 100,000 cubic yards of earth. The contract price is 16 cents per cubic yard.

The contractor began work under the contract on May 15, 1908, since which time he has had approximately 40 men, 150 horses, and 30 scrapers employed on the work. With this force the average of 1,800 cubic yards of material per day has been placed in the embankment. The number of cubic yards of material placed in the embankment by the contractor up to June 30, 1908, was 72,188.81.

The problem of débris control in the Sacramento and San Joaquin River systems is inseparably connected with those of flood control and navigation. As the United States assumes the paramount control of the river for navigation purposes, any satisfactory solution of the whole problem should, in the opinion of the Commission, be made under a project prepared and carried out by the War Department. Further, any plan for adequately developing the navigation must consider the floods, the water taken for irrigation, etc. The State of California and the owners of property injured by the floods will be the principal ones benefited by carrying out any plan for flood control, and should bear part of the cost. The United States and State of California have been for some years jointly interested in the problem of control of mining débris and have shared the cost, the work being done under the direction of the California Débris Commission. A similar plan would doubtless be satisfactory with reference to flood control, the relative amounts to be paid by the United States, by California, and by private owners to be determined in the plan.

During the past year the Commission has made several surveys along the Sacramento and Feather rivers for the purpose of obtaining data regarding the movement of mining débris, and for use in the preparation of a project for thorough control of the rivers at all stages. It is intended to continue these surveys during the present fiscal year and to submit, with the next annual report if practicable, a complete project for the flood control of the Sacramento River. The United States Engineer Department is making a survey of lower Sacramento and San Joaquin rivers for use in connection with the improvement of navigation in those streams, and data from that survey, when available, will be utilized by this Commission as far as possible in the preparation of this project.

year. Mr. Hammon and associates operated one gold dredge on this work a part of the time during the past year. Further progress in constructing these embankments is necessarily delayed until the north training wall, to be constructed under contracts with Anson B. Munson, is completed.

The embankments are being constructed for the United States and State of California in exchange for the right to extract gold from the gravel used in making the embankments.

The work of constructing a gravel embankment by means of gold dredges to confine and control the flow of Yuba River below Daguerre Point, under an agreement with John Martin (Marysville Gold Dredging Company, successor), was continued during the past year. This embankment is to be about 8,200 feet long, 300 feet wide on the base, and 30 feet in height at the highest places. About 3,000 feet of the total of 8,200 feet of this embankment has thus far been completed, 2,500 feet of which was placed during the past fiscal year. One gold dredge was employed on this work during the past year. This embankment is being constructed for the United States and State of California in exchange for the right to extract gold from the gravel used in making the embankment.

The work of constructing a gravel embankment extending downstream along the north bank of the Yuba River from Daguerre Point, under a contract with Anson B. Munson, dated March 29, 1905, as modified by two supplemental contracts dated September 21, 1907, and November 6, 1907, was continued during the past year. The two supplemental agreements above referred to were necessary in order to make provision for strengthening the embankment and to replace material carried away by the floods of March, 1907. This embankment is for the purpose of assisting in confining and directing the river at high stages. The dimensions of the embankment as provided in the original contract are: Length, about 12,000 feet; height, 11 to 13 feet; width on top, 10 feet; width on bottom, 65 to 75 feet. Under the supplemental contracts with Mr. Munson, about 3,400 linear feet of this embankment is to be constructed by a gold dredge to the following minimum dimensions: Height, 20 feet; width at top, 20 feet; width at base, 150 feet; and wing levees, generally 150 feet long, with 10-foot crown and 1 on 3 side slopes, are being built at frequent intervals along the riverside of the part of embankment built to the original cross section.

Up to June 30, 1908, the contractor had constructed about 12,000 feet of this embankment (of which, however, about 1,000 feet was washed out by the flood of March, 1907) and 6 of the wing levees. Up to that date 223,177 cubic yards of material had been placed in the embankment, of which 31,860 cubic yards were placed during the past year. The amount earned by the contractor during the past fiscal year was as follows:

Earth embankment constructed (under supplemental agreements of September 21 and November 6, 1907), 31,860 cubic yards, at 25 cents per cubic yard	$7,965.00
Deduct one-half payable by the State of California	3,982.50
Balance payable by the United States	3,982.50

The supplemental contract with Mr. Munson, dated September 21, 1907, provided that the contractor should receive the 10 per cent

ABSTRACTS OF CONTRACTS IN FORCE DURING FISCAL YEAR ENDING JUNE 30, 1908.

Name of contractor, Anson B. Munson; contract approved April 12, 1905; work to be begun on or before June 16, 1905, and to be completed on or before June 18, 1906. (Time for completion afterwards extended.) The contract provided that the contractor should construct 200,000 yards of embankment fill at 12.4 cents per cubic yard. Contractor placed 191,817 cubic yards, when, in March, 1907, it was found necessary, on account of damage caused by floods, to replace portions of the embankment and strengthen other portions. Accordingly, supplemental agreements were entered into with the contractor on September 21, 1907, and November 6, 1907, which require the contractor to furnish and place 140,000 cubic yards of embankment at 25 cents per cubic yard and 60,000 square yards of brush protection at 15 cents per square yard. The two supplemental agreements were approved on October 15, 1907, and December 5, 1907, respectively. They required work to be begun by January 14, 1908, and to be completed by November 30, 1909.

Name of contractor, Edward Malley; contract approved March 8, 1907; work to be begun on or before April 18, 1907, and to be completed by October 31, 1907. The contract provided that the contractor should excavate 75,000 yards of earth at 99 cents per cubic yard; excavate 15,000 yards of rock at $1.50 per cubic yard; excavate 3,000 yards of material for bulkhead trench at 75 cents per cubic yard; furnish all materials (except cement) for, and deliver and place 400 yards of concrete for entrance sill at $7 per cubic yard, 800 yards of concrete for side wall at $6 per cubic yard, 1,900 yards of barrier covering concrete at $6 per cubic yard, and 48 yards of concrete for abutment at $6 per cubic yard; drive 210 piles at $20 each; furnish, deliver, and place 55,000 feet of bulkhead timber at $45 per 1,000 feet B. M., 7,000 tons of rock fill (including sluicing of sand and gravel) at $1.75 per ton, 5,000 tons of large rock to protect toe of barrier at $2.50 per ton, 7,400 feet of 1-inch wire cable at 15 cents per linear foot, and 2,700 pounds of 3-inch mesh (No. 10 United States gauge) expanded metal at 10 cents per pound.

By reason of the extensive damage sustained by Barrier No. 1, Yuba River, on March 17, 1907, work under this contract was stopped shortly after the contractor began operations. The contract was terminated under the terms of a supplementary agreement dated April 27, 1907, and approved January 22, 1908.

Name of contractor, Edward Malley; emergency contract entered into April 27, 1908; work to be begun by October 1, 1908, and to be completed by March 1, 1909. The contract provides that the contractor shall furnish and place 100,000 cubic yards of earth, at 16 cents per cubic yard, in a portion of the embankment of the proposed settling basin on Yuba River, California.

Abstract of leases in force during fiscal year ending June 30, 1908.

Name of lessor.	Date of lease.	Date lease became effective.	Date lease expires.	For use of—	Compensation per month.
Elizabeth J. Kennedy.	May 7, 1907	May 7, 1907	Nov. 7, 1907	Office rooms, San Francisco.	$45.00
Do	Oct. 25, 1907	Nov. 8, 1907	May 8, 1908	do	45.00
Do	Jan. 23, 1908	Jan. 24, 1908	do	do	10.00
Do	May 9, 1908	May 9, 1908	Nov. 1, 1908	do	55.00
G. H. Williams	Apr. 4, 1908	Apr. 15, 1908	Sept. 15, 1908	Launch and services of one man.	110.00
A. C. Hartley	do	do	do	Launch	40.00
John Busch	Apr. 9, 1908	do	do	House boat	30.00
Joseph Ross	Apr. 15, 1908	do	do	do	10.00
Robert Sheridan	Apr. 16, 1908	Apr. 16, 1908	do	do	12.00
Carson C. Cook	Apr. 15, 1908	Apr. 15, 1908	do	do	40.00
Frank Baptiste	Apr. 20, 1908	Apr. 20, 1908	Sept. 20, 1908	do	40.00
John Fisher	Apr. 29, 1908	Apr. 29, 1908	Sept. 29, 1908	Launch and services of one man.	140.00
Walter Egbert	May 8, 1908	May 8, 1908	Sept. 8, 1908	House boat	10.00

APPENDIX E E E.

BRIDGES AT WASHINGTON, DISTRICT OF COLUMBIA.

REPORT OF MAJ. SPENCER COSBY, CORPS OF ENGINEERS, OFFICER IN CHARGE FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

1. Repair of the Aqueduct Bridge across Potomac River at Washington, District of Columbia.
2. Highway bridge across the Potomac River at Washington, District of Columbia.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., July 20, 1908.

SIR: I have the honor to forward, herewith, annual reports for the fiscal year ending June 30, 1908, for bridges at Washington, D. C. Under the provisions of Department letter of April 11, 1908, Capt. E. J. Dent, Corps of Engineers, was in temporary charge from May 5 to June 30, 1908.

Very respectfully,

SPENCER COSBY,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

E E E 1.

REPAIR OF THE AQUEDUCT BRIDGE ACROSS THE POTOMAC RIVER AT WASHINGTON, DISTRICT OF COLUMBIA.

WORK OF THE FISCAL YEAR ENDED JUNE 30, 1908.

(A) REPAIRS TO OLD PIERS.

No examination or repair of the portions below water was undertaken during the fiscal year, as these portions had been repaired during April and May, 1907, and left in as good condition as practicable.

The masonry above the water line of all the old piers, except No. 1, was pointed up wherever necessary during September and October, 1907.

Money statement.

July 1, 1907, balance unexpended	$15,053.37
June 30, 1908, amount expended during fiscal year	97.36
July 1, 1908, balance unexpended	14,956.01

(B) RECONSTRUCTION OF PIER NO. 1.

A contract was entered into July 24 for all of the work in connection with the removal of the old pier and the construction of the new one.

Dredging around the pier was commenced August 15 and continued at intervals during the remainder of the month. From about the first of September the dredging work was carried on continuously until practically all of the riprap, which would have interfered with the construction of the cofferdam, was removed.

Although considerably delayed by slow timber deliveries, the crib for the cofferdam was finally completed and sunk into place about the middle of November. The work of driving sheet piling around the outside of the crib was completed late in the same month.

Puddling material was placed around the dam and in the bottoms of the crib pockets, and about the first of January the work of pumping out the dam and placing interior braces was commenced. The water had been lowered to about 23 feet below mean low water by January 13, when a severe freshet in the river occurred, and it became necessary to suspend operations. The freshet carried away practically all of the puddling material from around the dam, and the water overflowed the top, filling the dam, loosening the interior braces and opening the sheeting in a number of places. The dam was repaired, the puddle was replaced, and pumping was resumed on the 22d. On the 26th a break in the sheeting caused the dam to fill, delaying the work again. Before the dam could be repaired and a sufficient quantity of puddle placed around it the river became frozen over, making it impossible to obtain the material for puddling. This condition existed until the middle of February, when the river opened sufficiently to permit operations to be resumed. These were again interrupted almost immediately by the breaking up of the ice above the bridge, followed by a freshet. The dam was finally emptied of water about the end of February.

Timber towers, carrying "A" frames to support the bridge trusses, were erected and the load was transferred from the pier to this false work. The removal of the old pier was commenced March 24 and completed April 24, including the clearing off of all mud and débris from the rock bottom of the river.

The general character of the old masonry was about the same as that of the other two piers which have been rebuilt (Nos. 4 and 5), consisting of undressed stones of irregular size and shapes, laid in an inferior quality of mortar. The last few feet at the bottom showed little or no trace of mortar, and several large cavities were found.

The appearance of the rock bottom of the river was about the same as at piers Nos. 4 and 5, consisting of irregular projections and depressions. There is a general slope toward the downstream end of the pier, the depths along the center being greater than on the sides.

The construction of the concrete base of the new pier was begun April 25 and completed May 16. The setting of stone for the facing of the upper portion of the pier was commenced May 18, the last course under the coping was laid and backed up with concrete on June 20, the bridge seats were set on June 27, and the remainder of the coping had all been set by June 30.

Two shifts of eight hours each were employed during the tearing down and rebuilding operations.

The work remaining to be done consists in the lowering of the bridge trusses to a bearing on the new pier, the removal of puddling material, cofferdam, and false work, and general cleaning up.

Money statement.

July 1, 1907, balance unexpended	$80,000.00
June 30, 1908, amount expended during fiscal year	25,199.72
July 1, 1908, balance unexpended	54,800.28
July 1, 1908, outstanding liabilities	274.58
July 1, 1908, balance available	54,525.70
July 1, 1908, amount covered by uncompleted contracts	41,080.33

CONTRACT IN FORCE.

Contractor: Charles McDermott, of Washington, D. C., for reconstruction of pier No. 1, Aqueduct Bridge, D. C.

Date of contract: July 24, 1907.

Approved: August 1, 1907.

Date for commencement: August 17, 1907.

Date for completion: January 1, 1908.

Rate and amount: For the construction of the new pier (except the concrete footing below elevation —28.0), $40,000. For the concrete footing of the new pier below elevation —28.0, 120 cubic yards (more or less), at $20 per cubic yard. For the removal of the masonry of the old pier, including the coping and ice breaker, down to elevation —15.0, 980 cubic yards (more or less), at $3 per cubic yard. For the removal of old masonry, riprap, mud, and débris, without classification, between elevation —15.0 and the rock bottom of the river, 1,530 cubic yards (more or less), at $9.50 per cubic yard.

E E E 2.

HIGHWAY BRIDGE ACROSS THE POTOMAC RIVER, WASHINGTON, DISTRICT OF COLUMBIA.

WORK OF THE FISCAL YEAR ENDED JUNE 30, 1908.

(A) CONSTRUCTION.

At the beginning of the fiscal year all of the work to be done by the Government in connection with the construction of the highway bridge and approaches had been completed with the exception of a few minor details.

The principal work remaining to be done was the installation by the Washington, Alexandria and Mount Vernon Railway Company of its underground conduit system and the placing of paving between and alongside its tracks on the Washington approach. At the beginning of the fiscal year only a short section of track on and near the Washington channel bridge had been installed and none of it was completed, although this office had made repeated efforts to hasten the work.

By act of Congress approved March 2, 1905, the Washington, Alexandria and Mount Vernon Railway Company was authorized to

operate its cars from the terminus of its underground system at Fourteenth street and Maryland avenue SW., to the north end of the Highway Bridge, by a standard overhead trolley system, for a period of fourteen months from the time the Highway Bridge was opened for traffic. This privilege expired April 12, 1907, but under the authority granted by the act, the Secretary of War extended the time to June 30, 1907. A further extension to December 1, 1907, was granted on condition that the railway company should furnish a bond in the penal sum of $75,000 to complete the work by that date. This condition was duly complied with by the company.

The section of track between the foot of Fourteenth street and a point about 200 feet south of the Washington channel bridge was completed and put in operation early in August.

Work on the section between this point and the Highway Bridge was commenced about the middle of September and was carried on at a satisfactory rate. The track work as far as the plow pits (about 270 feet from the north end of the Highway Bridge) was completed, except for paving, and was put in operation December 1, 1907. The paving was completed during December.

The railway company continued to operate cars by the overhead trolley and underground return on the stretch of about 270 feet between the plow pits and the Highway Bridge, although repeatedly notified by this office that this was in violation of the requirement of section 12 of act of Congress of February 12, 1901, which provides that "no dynamo furnishing power to this portion of the road shall be in any manner connected with the ground."

The Secretary of War notified the railway company on February 27, 1908, that unless this condition was remedied within thirty days from that date steps would be taken to enjoin the railway company from using a ground-return system on this section.

Injunction proceedings were deferred from time to time until July 2, 1908, when the Secretary of War decided to defer action until Congress could act on legislation pending for the relief of the railway company.

The macadam roadway on the Virginia approach was completed and opened for the use of light vehicles in August, 1907. Additional provision for drainage on this approach was also made.

A small tool house was erected on the Washington approach, near the north end of the main bridge.

The small amount of work remaining to be done by the Government on the Washington Channel Bridge, such as the erection of lamp-posts and railings, and the final dressing of concrete faces, was completed in August, 1907.

The unfinished portions of curb and paving in the vicinity of the channel bridge were completed by the contractors in December, 1907.

During the summer and fall of 1907 the Pennsylvania Railroad Company removed the old wagon bridge across the Washington channel and constructed new sea walls between the railroad and Government bridges. The banks above these walls were trimmed up and sodded in April, 1908.

In November and December, 1907, shade trees were set out along both approaches to the main bridge and the trees adjacent to the sidewalks were protected by boxes. The boxes were painted during April and May, 1908.

Alterations were made to the small lamps on the Washington Channel Bridge during June, in order to improve their service. Wrought-iron frames with sectional glass globes were erected on the large posts to replace the single glass globes which were originally furnished for these posts and which were found to be impracticable in operation.

In view of the fact that all of the construction work in connection with the highway bridge and approaches is now completed, it is recommended that both bridges and approaches, from the north abutment of the Washington Channel Bridge to the southern limit of the Virginia approach, be transferred to the charge of the office of public buildings and grounds as part of the park system.

The amounts disbursed during the fiscal year for the various portions of the work were as follows:

Washington Channel Bridge, $16,495.85; paving Washington approach, $3,964.70; constructing macadam road on Virginia approach, $5,004.22; extending drainage system on Virginia approach, $416.32; planting trees on approaches, including boxing, etc., $1,515.07; constructing tool house on Washington approach, $124.64.

Money statement.

July 1, 1907, balance unexpended	$32,353.04
June 30, 1908, amount expended during fiscal year	27,520.80
July 1, 1908, balance unexpended	4,832.24
July 1, 1908, outstanding liabilities	300.60
July 1, 1908, balance available	4,531.64
July 1, 1908, amount covered by uncompleted contracts	4,407.14

APPROPRIATIONS.

February 12, 1901	$568,000
April 27, 1904	428,000
March 3, 1905	200,000
Total	1,196,000

(B) MAINTENANCE AND OPERATION.

During the fiscal year the draw was opened 5,367 times for the passage of 6,064 vessels (exclusive of tows) or an average of approximately 14.66 openings per day. The average cost for current was 9.39 cents per opening.

Repairs were made to various parts of the operating machinery, the most extensive being to the motor operating the gates at the Virginia end of the draw. Due to the insulation becoming damaged by lightning, the armature was burnt out, making rewinding necessary. The repairs required about three weeks' time, during which this set of gates was operated by hand. In order to provide for future emergencies of this nature, a duplicate motor and additional spare parts, suitable for the gates at either end of the draw, were purchased. The repaired armature again broke down after about six months' service and a new spare armature was substituted for it at once. The old armature was sent back to the shop, where it was repaired without ex-

pense to the United States. With these exceptions and a few unimportant breakdowns, the machinery has continued to operate satisfactorily and is now in excellent condition.

Current for operating the draw and lighting the Washington approach was furnished by contract. Thirty-seven arc lights were maintained on the bridge during the year and 10 on the approach until September, when one additional light was installed on the approach.

The Washington channel bridge was lighted, under contract, by high power incandescent gaslights from December 27, service under this contract having been delayed until that date by the impracticability of making connections to the gas company's main, due to regrading operations in Fourteenth street.

The concrete roadways of the approaches have given satisfactory service. Although the grooves, intended to give a foothold to horses, in the top or wearing surface have become almost obliterated on portions of the roadway, the pavement shows no tendency to wear slippery. During the freezing weather of the winter months it became necessary to spread ashes on the asphalt paving of the bridge in order to maintain traffic, but this precaution was found to be unnecessary on the concrete roadway of the approaches. A number of isolated defective places, aggregating approximately 100 square yards, where the top coating had become entirely worn off or disintegrated under traffic, were repaired by the paving contractors under their guarantee to keep the pavement in repair for a period of five years.

The average daily travel over the bridge for seven consecutive days during June, 1908, was as follows:

Single cars, 51.7; trains of two cars each, 201.3; automobiles, 103.1; double teams, 780.6; single teams, 369.1; pedestrians, 543; equestrians, 8.6.

The steel work of portions of the bridge was repainted during the year and a supply of paint, sufficient to repaint all of the exposed parts, was purchased. Owing to lack of funds the work of applying the paint was postponed until the next fiscal year. It is proposed to do this work during the fall of 1908 or the spring of 1909.

The work of repairing and strengthening the timber fenders of the pivot and rest piers at the draw, which have been damaged from time to time by collisions with passing vessels, was commenced but not completed.

The disbursements during the fiscal year were as follows:

Outstanding from 1907:	
Services	$1,014.40
Lighting bridge and Washington approach	326.73
Current for operating draw	58.50
Telephone service	14.71
Supplies and materials for repairs	127.41
Fuel	10.05
From appropriation for 1908:	
Services	6,995.88
Lighting bridge and Washington approach	3,692.87
Current for operating draw	437.96
Lighting Washington channel bridge	159.14
Telephone service	46.21
Supplies, tools, and materials for ordinary repairs	247.30
Special repairs to machinery and spare parts	361.75
Paint for repainting bridge	1,560.72
Material for repairing fender (piles)	445.50

Estimate of cost of maintenance and operation for fiscal year ending June 30, 1910.

Salaries:	
2 draw operators, at $1,020 each	$2,040
1 draw operator, at $720	720
4 watchmen, at $600 each	2,400
Labor (regular) for cleaning roadway, etc	1,500
	6,660
Current for operating 6,000 openings at 9 cents	540
Lighting 48 arc lamps, at $85	4,080
Lighting 20 gas burners, at $20.85	417
Telephone service	63
Fuel for heating operating house	65
Miscellaneous supplies, grease, waste, oil, etc	375
Painting and repairs	2,500
Contingencies (additional labor, etc.)	700
Superintendence and office expense	600
Total	16,000

Money statements.

MAINTENANCE OF HIGHWAY BRIDGE ACROSS POTOMAC RIVER, DISTRICT OF COLUMBIA, 1907.

July 1, 1907, balance unexpended	$1,673.10
June 30, 1908, amount expended during fiscal year	1,551.80
July 1, 1908, balance unexpended	[a] 121.30

MAINTENANCE OF HIGHWAY BRIDGE ACROSS POTOMAC RIVER, DISTRICT OF COLUMBIA, 1908.

Amount appropriated by act of March 2, 1907	$16,000.00
June 30, 1908, amount expended during fiscal year	13,947.33
July 1, 1908, balance unexpended	2,052.67
July 1, 1908, outstanding liabilities	1,146.65
July 1, 1908, balance available	906.02
July 1, 1908, amount covered by uncompleted contracts	901.68

APPROPRIATIONS.

March 3, 1905	$7,000
June 27, 1906	11,600
March 2, 1907	16,000
May 26, 1908	16,000
Total	50,000

CONTRACTS IN FORCE.

Contractor: Penn Bridge Company, of Beaver Falls, Pa., for constructing concrete-steel arch bridge in approach to highway bridge across Potomac River, District of Columbia.

Date of contract: November 1, 1905.

Approved: December 1, 1905.

Date for commencement: November 1, 1905.

Date for completion: November 1, 1906. (Time for completion of contract waived.) Final payment made September 6, 1907.

For abstract of this contract, see Report of the Chief of Engineers, 1907, pages 2280 and 2281.

[a] Balance of $121.30 deposited in Treasury of the United States November 20, 1907 (reverted and dropped).

Contractor: Rudolph S. Blome Company, of Chicago, Ill., for construction of paving, furnishing and setting curb, etc., on approaches to highway bridge across Potomac River, District of Columbia.

Date of contract: September 11, 1906.

Approved: September 19, 1906.

Date for commencement: October 5, 1906.

Date for completion: December 1, 1906. (Time for completion of contract waived.)

For abstract of this contract, see Report of the Chief of Engineers, 1907, pages 2281 and 2282.

Contractor: Sand, Gravel and Supply Company, of Washington, D. C., for the construction of a macadam roadway on the Virginia approach.

Date of contract: May 8, 1907.

Date of commencement: May 18, 1907.

Date for completion: June 17, 1907. Time for completion of contract waived.

Rate and amount: Four thousand five hundred square yards of macadam roadway paving, including grading and rolling roadbed, at 75 cents per square yard; 2,000 linear feet of concrete gutter, including grading and preparation of foundation, at 60 cents per linear foot; 8 concrete catch-basins, including excavation, back filling, and setting castings, at $10 each; 50 linear feet of 8-inch terra-cotta drainpipe laid, including excavation and back filling, at $1.10 per linear foot; 16 bends 8-inch pipe, at 25 cents each; 8 Y-branches for 8-inch pipe, at 25 cents each; 210 linear feet of concrete curb altered for cross overs, at 30 cents per linear foot. Final payment made August 22, 1907.

Contractor: American Street Lighting Company, of Baltimore, Md., for lighting the bridge across Washington channel in approach to Potomac Highway Bridge, District of Columbia, with high candlepower gas lamps.

Date of contract: May 8, 1907.

Approved: May 16, 1907.

Maintenance and service to be continued until June 30, 1908.

Rate and amount: To furnish, maintain, and operate 20 incandescent gas-burners, of not less than 60 candlepower each, on the bridge across Washington channel in the approach to Potomac Highway Bridge, District of Columbia, at $20.85 per burner per year.

Paragraphs 2 and 3 of the specifications are modified as follows: In view of the fact that the globes for the four posts at the entrances to the bridge are of unusual size and must be made specially for these posts, the United States will furnish, in addiion to the apparatus mentioned in paragraph 2, one globe on each of the eight posts on the bridge. Any globes which afterwards become damaged or broken through neglect or carelessness of the contractor's employees must be replaced at the expense of the contractor by globes of the same design and quality as the original ones.

Contractor: Potomac Electric Power Company, of Washington, D. C., for furnishing, installing, and maintaining arc lights on the bridge and Washington approach and furnishing power for the operation of the swing span.

Date of contract: June 18, 1907.

Approved: July 11, 1907.

Maintenance and service to be continued until June 30, 1908.

Rate: Six cents per kilowatt hour for current for draw span; $85 per lamp per year for arc lights.

APPENDIX F F F.

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, AND WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, FILTRATION PLANT.

REPORT OF MAJ. SPENCER COSBY, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

UNITED STATES ENGINEER OFFICE,
Washington, D. C., July 20, 1908.

SIR: I have the honor to forward herewith the annual reports for Washington Aqueduct, District of Columbia, and Washington Aqueduct, District of Columbia, Filtration Plant. Under the provisions of Department letter of April 11, 1908, Capt. E. J. Dent, Corps of Engineers, was in temporary charge from May 5 to June 30, 1908.

Very respectfully,

SPENCER COSBY,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

F F F 1.

WASHINGTON AQUEDUCT.

By act of Congress approved March 2, 1907, appropriations were made for:

A. Maintenance and operation of the Washington Aqueduct and its accessories.
B. For purchase of a dredge for removing sediment from Dalecarlia Reservoir.
C. For removal, by dredging, of sediment from Dalecarlia Reservoir.
D. For riprapping shore of Dalecarlia Reservoir to protect the by-conduit.
E. For riprapping the sides of Dalecarlia Reservoir for a width of about 20 feet.
F. For parking the grounds at the Washington City Reservoir (now known as McMillan Park Reservoir).

(A) MAINTENANCE AND OPERATION.

The following operations were conducted during the fiscal year under the appropriation made for the maintenance and repair of the Washington Aqueduct and those parts of the water-supply system of the District of Columbia that are under the supervision of the Chief of Engineers:

GATEHOUSES, BUILDINGS, AND GROUNDS.

The gatehouses and other buildings were repaired and painted where necessary; the laborer's house at Dalecarlia Reservoir was remodeled at a cost of $1,479.95, and the fences, grounds, and machinery were kept in good order.

DALECARLIA RESERVOIR.

Several defects in this reservoir were mentioned in the Annual Report of the Chief of Engineers for 1906, pages 2087 and 2088. To remedy these defects appropriations aggregating $66,000 were made by Congress by act approved March 2, 1907. Operations under these appropriations are described under headings B, C, D, and E.

GEORGETOWN RESERVOIR.

The wooden picket fence on the side of the reservoir next the Conduit road was repaired and whitewashed. The remainder of the fence was replaced by a woven wire fence with pipe posts, at a cost of $525.86. Honeysuckle vines and climbing roses were planted along the line of the new fence, and it is expected that these will ultimately cover it and make it an attractive feature.

MCMILLAN PARK RESERVOIR.

The road and grounds around the reservoir have been kept in good condition and some trees have been set out. Operations under a special appropriation for "Parking Grounds, Washington City Reservoir," are described under F.

THE CONDUIT.

The upper portion of the conduit, between Great Falls and the north connection of Dalecarlia Reservoir, was drained and cleaned twice, and the lower portion, between the south connection of Dalecarlia reservoir and Georgetown Reservoir inlet, once during the year.

The upper portion was found to be generally in good condition and none of the defective places are considered dangerous. The upper third of the brick lining of that part of the conduit which passes over Cabin John Bridge has never been plastered. The mortar in which the bricks were laid has in many places worked out of the joints to a depth of an inch or more, and a considerable proportion of the leakage in this part of the conduit is probably due to these defective joints. This leakage is more or less serious, since the water finally escapes through the masonry of the bridge, and in winter it freezes and tends to move and disintegrate the masonry. About 74 feet of this arch was plastered with a mortar consisting of one part of quick setting Portland cement and one part of sand, and it is hoped that the coating of the entire arch can be completed by plastering a short section each time the conduit is drained.

When the conduit was drained on April 16, several cracks were found in culverts 17 and 18, and on June 11 these cracks, about 92 and 162 feet long, respectively, were filled with quick-setting Portland cement mortar.

THE TUNNEL.

The Washington Aqueduct tunnel was drained and inspected for a distance of 2½ miles between the west shaft and a point 700 feet west of Champlain avenue shaft. It was found to be in excellent condition, with two exceptions, viz, a considerable amount of plastering had become detached from the masonry lining, and the side walls had bulged slightly in two places.

The plastering was originally placed over the rubble masonry side walls to give them a smooth and presentable appearance. For some reason the bond between this lining and the old masonry was insufficient in some places to hold the plaster in place against the outside pressure. There are in all about 8 cubic yards of this plaster, which have become detached and have fallen to the bottom of the tunnel. It is in thin sheets from ½ inch to 1 inch in thickness, and its absence from the side walls is of no material consequence. In its present position on the invert of the tunnel it forms a slight obstruction to the flow of water and also forms eddies causing small deposits of mud. At the time the tunnel was pumped out a gang of men with wheelbarrows was set at work removing the fallen plaster, and about one-half of the total amount was removed. The remaining portion can probably be removed the next time the tunnel is emptied.

The bulged places in the side walls occur between the Fayette street air shaft and Foundry Branch, one being on the north wall about 1,000 feet west of the Fayette street air shaft, and the other on the south wall about 200 feet west of the same shaft. At each of these places the masonry side walls have bulged inward about 5 inches at the point of maximum movement. The length of wall affected is in each case about 15 feet. These defects will be repaired at an early date by placing adjustable struts of 4-inch extra heavy wrought-iron pipe at each place, and it is believed that this will prevent any further movement in the masonry.

It was impossible to pump out the remaining portion of the tunnel as, if the tunnel had been held out of service for a longer time, the water in the McMillan Park Reservoir would have fallen so low that it would have been impossible to maintain the supply of filtered water to the city.

THE CONDUIT ROAD.

The fill over the culvert which was built last year below the spillway of Dalecarlia Reservoir was completed and the roadway was macadamized.

About 700 cubic yards of broken stone were placed on a section of road between Bridge No. 3 and Cabin John Bridge. The gutters were cleaned and weeds cut. The road was patrolled by a special officer mounted on a motor cycle.

THE BRIDGES.

During October, 1906, a new floor was laid on the Pennsylvania Avenue Bridge across Rock Creek, at a cost of $552.01. Two thicknesses of plank were used, the lower being laid diagonally and treated with a liquid wood preservative. The upper layer of planking was Georgia pine 1½ inches in thickness. In March, 1908, after seventeen

months' use this upper layer had become worn entirely through in many places and the worn-out upper layer was replaced by a new one of 2-inch white oak at a cost of $287.

THE MAINS.

Prior to August, 1905, the mains leading from the distributing reservoir were used for a gravity supply to the city. On August 21, 1905, the gates at the distributing reservoir were closed, and since that date the entire supply has passed through the tunnel to the McMillan Park Reservoir. The mains are now more than ever before an integral part of the city distributing system.

By mutual agreement they are now operated and maintained by the city water department. It is again recommended that their formal transfer to the city be authorized.

TURBIDITIES.

The practice of closing the inlet gates at Great Falls whenever the turbidity of the Potomac water reaches 500 or more, as described in the Annual Report of the Chief of Engineers for 1906, pages 2090 and 2091, was continued during the fiscal year, with the results shown in the following table, which are of course only approximate:

TABLE No. 1.—*Table showing tons of suspended matter entering the system, etc.*

	Amount that would have entered the system if the gates had been left continuously open.	Number of hours gates were closed.	Amount shut out.	Amount deposited in Dalecarlia Reservoir.	Amount deposited in Georgetown Reservoir.	Amount deposited in McMillan Park Reservoir.	Amount entering Filtration Plant.	Total.
July	805	48	356	218	63	72	136	805
August	518	25	177	252	5	53	61	518
September	832	33	230	.....	312	99	121	832
October	193	.....	.....	.....	73	9	111	193
November	523	.....	.....	.....	349	85	89	523
December	819	66	390	.....	183	61	185	819
January	1,512	17	179	1,015	8	44	266	1,512
February	2,345	139	1,639	531	.....	82	132	2,345
March	492	.....	.....	192	39	99	162	492
April	173	.....	.....	.....	70	26	77	173
May	1,205	138	822	188	45	68	82	1,205
June	228	.....	.....	115	21	26	76	228
Total	9,055	463	3,684	2,511	1,258	721	1,428	9,055

From the above it is seen that the gates were closed 5 per cent of the time, thereby excluding 38 per cent of the total suspended matter that would otherwise have entered the system.

When the gates at Great Falls, Md., are closed the supply of water to the city is maintained by drawing from the water stored in the reservoirs. A typical curve showing the drop in level in the McMillan Park Reservoir, due to a continuous three-day shut off, is shown on the accompanying plate. It will be noted that it takes ten days for the water to regain its original level. Three days are considered to be about the safe maximum limit during which the gates should remain closed.

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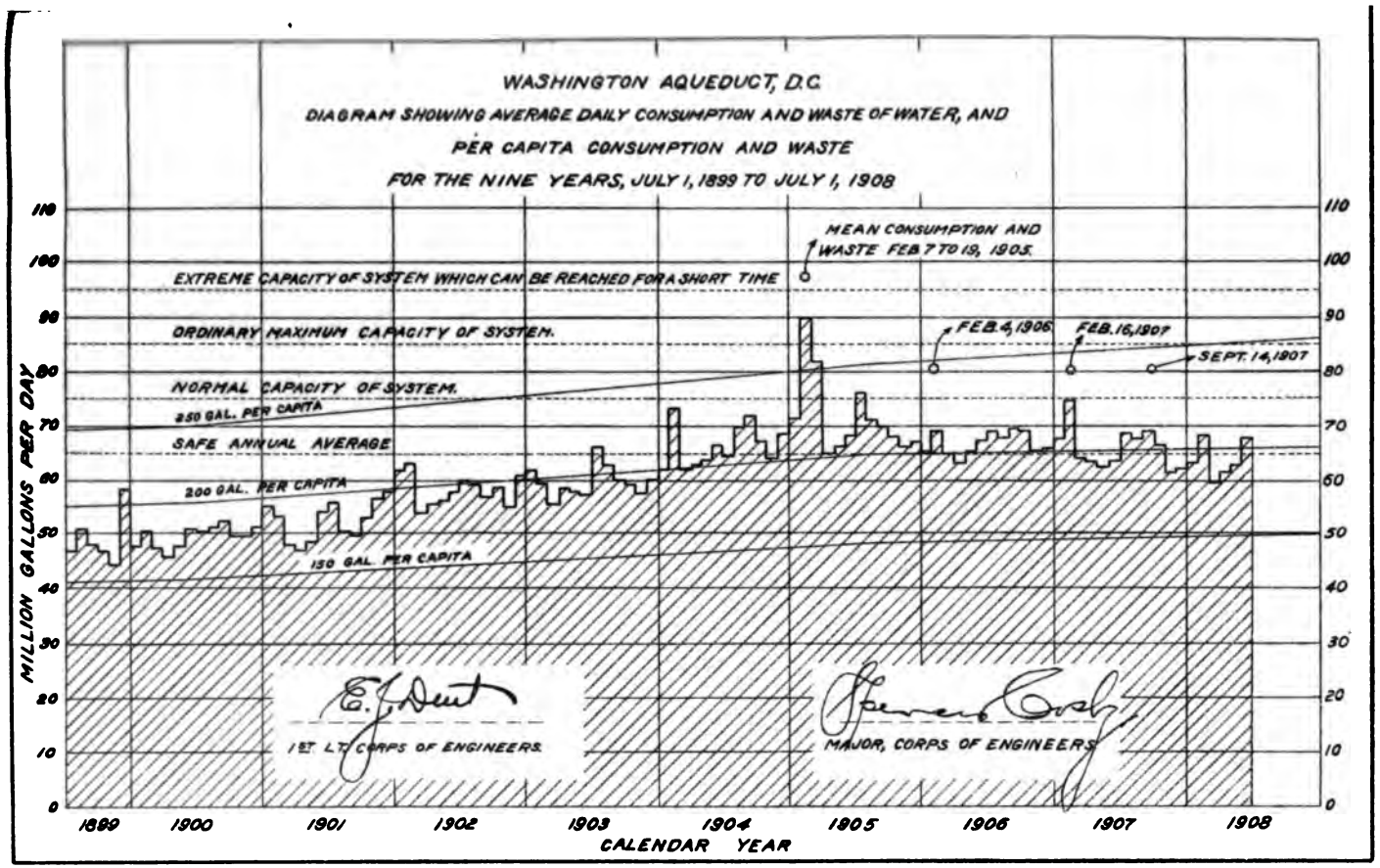

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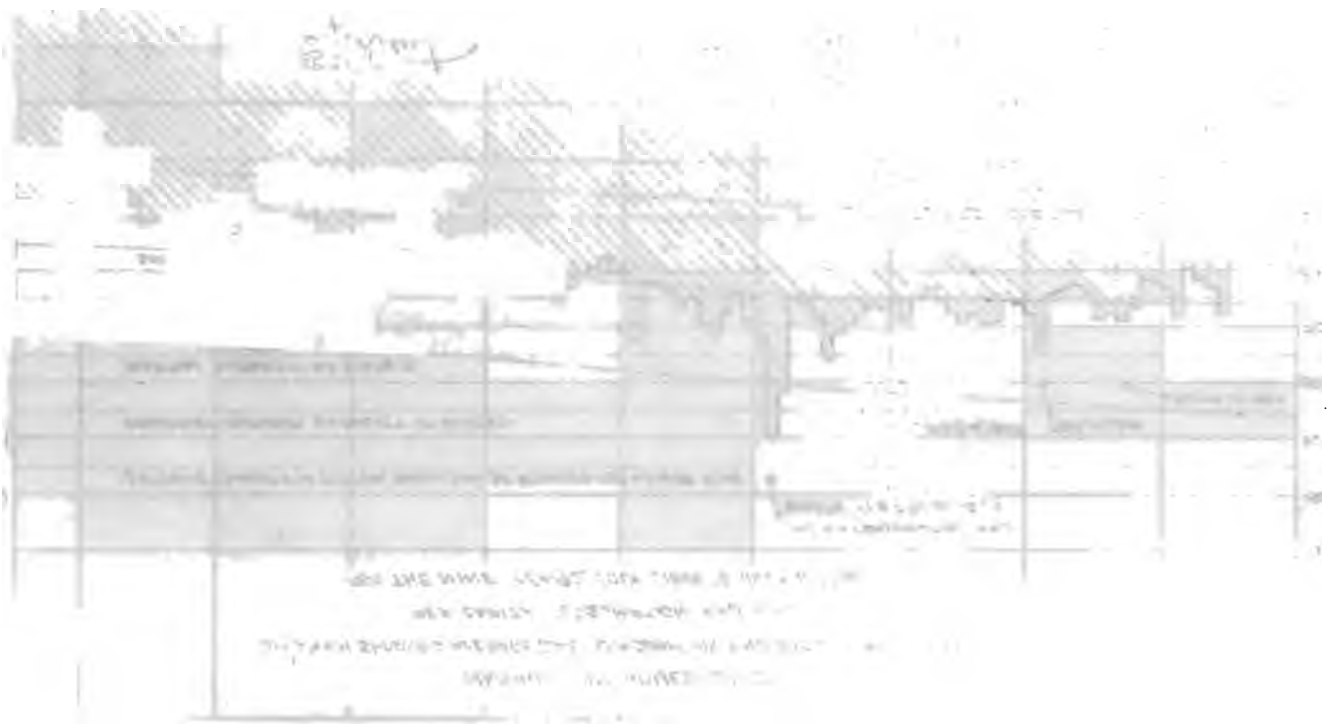

HOUSE FOR ASSISTANT WATCHMAN AND STOREHOUSE AND STABLE AT GREAT FALLS, MD.

Attention is invited to the last annual report, in which the reasons are stated that render it advisable that a house for an assistant watchman and that a suitable storehouse and stable be constructed at Great Falls. The conditions reported last year still exist and the recommendations made in the last annual report are repeated. An estimate of $3.000 for a dwelling for the assistant watchman and an estimate of $3,000 for a storehouse and stable are submitted.

CONSUMPTION AND WASTE OF WATER.

Tables showing the average consumption of water per twenty-four hours, by years from 1874 to 1906, and by months from July, 1899, to June, 1906, will be found in the Annual Report of the Chief of Engineers for 1906, page 2092. The following table covers the fiscal years 1907 and 1908, and the accompanying diagram gives a graphic comparison with the consumption for previous years since 1899:

Table showing average consumption of water for twenty-four hours.

	Fiscal year 1907.	Fiscal year 1908.
	Mil. gals.	*Mil. gals.*
July	69.18	68.64
August	68.08	67.74
September	69.82	68.93
October	69.14	66.46
November	65.51	61.54
December	65.71	62.29
January	67.62	63.36
February	74.68	68.17
March	64.23	59.63
April	63.45	61.51
May	62.47	62.96
June	63.53	67.96
Average	66.90	64.91

Population, police census, 1908, 339,403.

Average per capita consumption July 1, 1907–June 30, 1908, 192 gallons.

The maximum consumption for any day during the year was 80.38 million gallons, on September 14, 1907.

In accordance with act of Congress approved May 26, 1908, appropriating the sum of $10,000 for preliminary investigations and surveys for increasing the water supply, an investigation will be begun at once. As reported annually for several years, the present system can not be safely depended upon to supply a greater quantity of water to the city than it is actually furnishing at present. The investigation to be undertaken is only a preliminary step and the additional works necessary to secure an increased supply will require several years to construct, even after they are authorized by Congress.

It is absolutely essential that measures for the prevention of waste be continued, in order that the increased demand due to an increased population may be fully compensated for by a reduction in waste. It is believed that universal metering, if adopted, should reduce the per capita consumption to less than 120 gallons per day, the experi-

ence of other cities having shown that this is ample for all household, commercial, and public purposes.

It is recommended that the Federal Government set an example in this respect and that all Federal buildings and institutions be metered. According to an estimate made by the Commissioners of the District of Columbia during the year 1905, the quantity of water supplied daily to these institutions was about nine million gallons. At the prevailing meter rates the value of this quantity of water is about $131,400 per year.

Money statements.

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, 1907.

July 1, 1907, balance unexpended	$3,725.12
June 30, 1908, amount expended during fiscal year	3,697.21
July 1, 1908, balance unexpended	[a] 27.91

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, 1908.—MAINTENANCE.

June 30, 1908, amount expended during fiscal year	$29,405.50
July 1, 1908, balance unexpended	3,624.79
July 1, 1908, outstanding liabilities	3,579.83
July 1, 1908, balance available	44.96

Appropriations for the Washington Aqueduct, dates of acts, and reversions to the Treasury.

Prior to 1879, total contributed by United States.			Subsequent to 1879, one-half contributed by United States and the other half by the District of Columbia.		
Date.	Amount.	Reverted to Treasury.	Date.	Amount.	Reverted to Treasury.
September 30, 1850	$500		March 3, 1879	$20,000	$109.87
August 31, 1852	5,000	$2.81	June 4, 1880	20,000	381.06
March 3, 1853	100,000		March 3, 1881	20,000	
March 3, 1855	250,000		July 1, 1882	20,000	1,354.17
August 18, 1856	250,000		March 3, 1883	20,000	
March 3, 1857	1,000,000		July 5, 1884	20,000	
June 12, 1858	800,000		February 25, 1885	20,000	
June 25, 1860	500,000		July 9, 1886	20,000	
July 4, 1864	150,000		March 3, 1887	20,000	
July 28, 1866	142,584		July 18, 1888	20,000	2,266.34
December 20, 1866	12,000		March 2, 1889	20,000	4.12
March 2, 1867	20,000		August 6, 1890	25,500	5,500.00
July 25, 1868	52,500		March 3, 1891	20,000	
March 3, 1869	25,000		July 14, 1892	20,000	
July 15, 1870	120,822	46.25	March 3, 1893	80,000	
March 3, 1871	114,196		August 7, 1894	82,500	4.16
June 10, 1872	70,555		March 2, 1895	71,500	2,983.87
January 23, 1873	14,000		June 11, 1896	25,000	285.85
March 3, 1873	43,600	560.87	March 3, 1897	26,000	1,828.53
June 23, 1874	36,400	.35	June 30, 1898	22,000	
March 3, 1875	26,000		March 3, 1899	25,000	
July 31, 1876	22,000		June 6, 1900	37,000	1,510.02
March 3, 1877	15,000		March 1, 1901	22,000	
June 20, 1878	15,000		July 1, 1902	33,000	
			March 3, 1903	33,000	
			April 27, 1904	33,000	
			March 3, 1905	33,000	
			June 27, 1906	33,000	27.91
			March 2, 1907	102,000	
			May 26, 1908	33,000	
Total	3,785,157	610.28	Total	979,500	16,255.90

[a] Balance of $27.91 deposited in Treasury of the United States (reverted and dropped).

Net amount contributed by United States	$4,265,918.77
Net amount contributed by District of Columbia	481,372.05
Total	4,747,290.82

ABSTRACT OF CONTRACT IN FORCE.

Contractor: J. Maury Dove Company, for bituminous coal.
Date of contract: April 6, 1908 (emergency).
Date of commencement: April 13, 1908.
Date for completion: June 30, 1908. Final payment May 21, 1908.
Amount and rate: Furnishing and delivering 200 tons bituminous coal at $4.75 per ton.

(B) DREDGE FOR DALECARLIA RESERVOIR.

Proposals for a 10-inch hydraulic dredge and accessories were opened on June 13, 1907, and the contract was awarded to the lowest bidder, the Wetherill Brothers Machine Company, of Chester, Pa., for $26,400. The contract was approved by the Chief of Engineers on July 27, 1907. Work was begun in August, 1907, and completed in January, 1908. The dredge was accepted and the final payment made in April, 1908.

The dredge is on a scow 66 feet long by 24 feet beam. The suction is 10 inches in diameter and the pump is rated as 10-inch. In order to reduce the loss due to friction in the discharge pipe a 12-inch pipe is used. The cutter is of the ordinary revolving type, operated by a separate engine. There is a 5-drum swinging and hoisting engine and a 150-horsepower boiler. The dredge is equipped with 40 pontons, 1,000 feet of discharge pipe, and a full set of sleeves, tools, etc.

The work done by the dredge is described under C.

Money statement.

June 30, 1908, amount expended during fiscal year	$27,893.90
July 1, 1908, balance unexpended	2,103.10
July 1, 1908, balance available	2,103.10

(C) DREDGING DALECARLIA RESERVOIR.

Dredging was delayed until the completion of the construction of the dredge referred to in section B. Actual work was begun during January and has continued from that date to the close of the fiscal year.

Due to difficulties in operating a new plant very little was accomplished during January and February. Since March 1, 1908, excellent progress has been made.

One eight-hour shift was employed until April 13, 1908, and since that date two eight-hour shifts have been employed.

The total amount of material to be excavated is estimated as 160,000 cubic yards. The amount dredged during the fiscal year was 46,380 cubic yards. The average number of cubic yards dredged per eight-hour shift from March 1 to June 30, 1908, was 365 cubic yards. The total cost of dredging to June 30, 1908, has been 11.06 cents per cubic yard, including bank construction and all other necessary expenditures.

As all of the dredging could not be completed during the fiscal year 1908, Congress, by act approved May 26, 1908, provided that any unexpended balance under the appropriation for dredging should continue to be available for the fiscal year 1909.

Money statement.

June 30, 1908, amount expended during fiscal year	$4,485.08
July 1, 1908, balance unexpended	11,514.92
July 1, 1908, outstanding liabilities	642.83
July 1, 1908, balance available	10,872.09

(D) RIPRAPPING SHORE OF DALECARLIA RESERVOIR TO PROTECT THE BY-CONDUIT.

The work done during the fiscal year consisted in placing about 2,300 cubic yards of fill between the by-conduit and the reservoir and protecting the fill by riprap. The number of cubic yards of riprap placed was about 200, and the total cost was $2,000.

Money statement.

June 30, 1908, amount expended during fiscal year	$2,000.00

(E) RIPRAPPING SIDES OF DALECARLIA RESERVOIR FOR A WIDTH OF ABOUT 20 FEET.

Investigations before July 1, 1907, indicated that the cheapest way of doing the work would be to open up a quarry on Government land near the southeast end of the reservoir and to do all work by hired labor.

Work was begun on July 1, the quarry was opened up, scows were built for transporting the stone, and tracks were laid for carrying the stone from the quarry to the scows. The work consisted in grading the shore line to a uniform slope of one vertical to two horizontal, and protecting it by a 9-inch layer of riprap between elevations 141 and 149, the normal level of the water in the reservoir being about 146.5.

Work was continued until January, 1908; 6,886 linear feet of shore line were graded and riprapped, and 3,806 cubic yards of stone were quarried. The work is about 62 per cent completed. The total cost to the end of the fiscal year 1908 was $13,109.31.

Due to the shoal water near the shore line, it was found to be impossible to complete the work economically until after the completion of a large part of the dredging described in section C. For this reason Congress, by act approved May 26, 1908, provided that any unexpended balance under the appropriation for riprapping should continue to be available for the fiscal year 1909.

Money statement.

June 30, 1908, amount expended during fiscal year	$13,109.31
July 1, 1908, balance unexpended	4,890.69
July 1, 1908, balance available	4,890.69

(F) PARKING THE GROUNDS AT THE WASHINGTON CITY RESERVOIR (NOW KNOWN AS MCMILLAN PARK RESERVOIR).

The top of the dam south of the reservoir was graded, seeded with grass and drained, and trees were set out.

A topographical map has been made of the entire park and plans for future improvements are being prepared.

Money statement.

June 30, 1908, amount expended during fiscal year	$2,726.21
July 1, 1908, balance unexpended	273.79
July 1, 1908, outstanding liabilities	273.79

F F F 2.

WASHINGTON AQUEDUCT, DISTRICT OF COLUMBIA, FILTRATION PLANT.

(A) CONSTRUCTION.

The work of construction had been practically completed at the beginning of the fiscal year. During the year a building which is to be used as a machine shop was erected by contract; an additional filter unit was built at the experimental plant at Dalecarlia Reservoir, and the gratings for covering the wells in the regulator houses were completed.

The only contract now in force is the one with Henry R. Worthington for the main pumping engines. These had been installed and were in good working order when the filtration plant was first put into service. They failed, however, by a small margin, to meet the requirements of the specifications as to duty and the contractor was required to replace the condensers by new ones having a larger clear water way. By so doing the required duty was attained.

These pumps were accepted in August, 1907, but by a provision of the contract the final payment will not be due until after they have been in successful operation for one year after the date of the successful completion of the duty trials.

AMOUNTS AND DATES OF APPROPRIATIONS FOR THE WORK.

June 6, 1900	$200,000	March 3, 1903	$500,000
March 1, 1901	500,000	April 27, 1904	1,568,155
July 1, 1902	600,000		
July 1, 1902 (deficiency)	250	Total	3,468,405

Abstracts of contracts.

Name.	Rate.	Date of approval.	Date of expiration.
Henry R. Worthington:			
Main pumping engines ..... each	$14,000	June 17, 1903	Dec. 1, 1904*
Pumping engines, sand-washing ..... each	4,000	.....	.....

* Time limit for completion of contract waived.

Money statement.

July 1, 1907, balance unexpended	$67,913.79
June 30, 1908, amount expended during fiscal year	13,923.06
July 1, 1908, balance unexpended	53,990.73
July 1, 1908, outstanding liabilities	4,494.67
July 1, 1908, balance available	49,496.06

(B) MAINTENANCE AND OPERATION.

A general description of the filtration plant was given in Appendix D D D 2, pages 2101 to 2103, of the Annual Report of the Chief of Engineers for 1906.

Turbidities.—The maximum, minimum, and average turbidities of the samples of water tested during the year are shown in the following table:

TABLE No. 1.

TURBIDITIES.

[United States Geological Survey standard.]

	Great Falls.	Dalecarlia Reservoir outlet.	Georgetown Reservoir outlet.	McMillan Park Reservoir outlet.	Filtered water reservoir.
Maximum	3,000	340	250	160	20
Minimum	7	7	8	6	0
Average	117	53	45	31	2

The turbidity of the water applied to the filters exceeded 50 on fifty days during the year; it exceeded 100 on only eight days. The turbidity of the filtered water was one or more for 67 per cent of the year; during more than half of this time, or for 39 per cent of the year, it was two or more, and it reached six or more during 9 per cent of the year.

Bacteria.—Daily analyses have been made of samples of water taken at Dalecarlia Reservoir inlet (which are believed to represent fairly the river water at Great Falls), at the outlet of this reservoir, at Georgetown Reservoir outlet, at McMillan Park Reservoir outlet, in the filtered water reservoir, and from each of the filters in operation. Samples from taps in various parts of the city are taken and tested once each week. All samples are tested by standard methods and the number of bacteria per cubic centimeter in each determined. In addition to this work many tests are made for the colon bacillus.

The results of this work are summarized in the following table:

TABLE No. 2.

Bacteria per cubic centimeter.

	Dalecarlia Reservoir.		Georgetown Reservoir outlet.	McMillan Park Reservoir outlet.	Filtered water reservoir.
	Inlet.	Outlet.			
Maximum	80,000	65,000	52,000	19,000	900
Minimum	16	17	28	16	4
Average	6,259	2,701	2,939	1,252	55

TABLE No. 3.

SUMMARY OF RESULTS OF TESTS FOR BACILLUS COLI.

	Cubic centimeters.	Total samples examined.	Number positive.	Percentage positive.
Great Falls or Dalecarlia inlet	10	307	137	45
	1	307	96	31
	1/10	307	40	13
Dalecarlia outlet	10	65	21	32
	1	65	8	12
	1/10	65	2	3
Georgetown Reservoir	10	122	42	34
	1	122	27	22
	1/10	122	5	4
McMillan Park Reservoir (applied water)	10	351	78	22
	1	351	33	9
	1/10	351	5	1
Filtered water reservoir	10	351	10	3
	1	351	1	1
Tap water from various parts of city	10	765	24	3
	1	765	7	1

Some of the more important results of the filter and pumping station operations and of the sanitary analyses, as well as typhoid statistics, etc., are given in the following tables:

TABLE No. 4.

SUMMARY OF EXPENDITURES AND LIABILITIES INCURRED.

	Labor.	Material.	Total.
Office and laboratory	$16,487.66	$1,864.15	$18,351.81
Pumping station	13,947.07	18,516.46	32,463.53
Filter operation	21,211.05	5,629.70	26,840.75
Experimental filters	2,230.93	32.41	2,263.34
Main office	2,138.50	320.83	2,459.33
Total	56,015.21	26,363.55	82,378.76

Amount of work done.

Quantity of water pumped to filters	million gallons	23,758.24
Quantity of water pumped to sand washers	do	76.986
Number of filters cleaned		221
Amount of sand scraped	cubic yards	22,275
Total amount of sand washed	do	22,275
Amount of sand replaced in filters	do	21,393

TABLE No. 5.

COST PER MILLION GALLONS FILTERED.

Value of materials on hand July 1, 1907	$18,256.90
Value of materials purchased	26,532.49
Value of materials on hand June 30, 1908	44,789.39
	26,520.74
Value of materials expended during fiscal year	18,268.65
Labor during fiscal year	56,015.21
Total cost of filtration (23,758.24 million gallons)	74,313.86
Cost during fiscal year per million gallons:	
Labor	2.36
Material	.77
Total	3.13

TABLE No. 6.

FILTER RUNS, OR PERIODS OF OPERATIONS BETWEEN CLEANINGS.

	Duration in days.	Million gallons filtered.	Sand removed.	Depth of scraping.
			Cubic yds.	*Inches.*
Maximum	138	477.19	498	4.10
Minimum	9	20.11	46	.34
Average	46	121.46	180	1.34

TABLE No. 7.

PUMPING STATION (AVERAGE DAILY RESULTS).

	Million gallons pumped.		Lift to filters.	Pressure at sand washer pump per square inch.	Coal consumed per day.	Station duty per 100 pounds of coal consumed.
	To filters.	To sand washers.				
			Feet.	*Pounds.*	*Tons.*	
Maximum	80.38	0.735	28.03	125.0	12.0	70.7
Minimum	54.35	.017	19.74	125.0	7.2	51.3
Average	64.91	.347	22.20	125.0	9.6	60.3

TABLE No. 8.

SUMMARY OF SANITARY CHEMICAL ANALYSES OF WEEKLY SAMPLES (RESULTS GIVEN IN PARTS PER MILLION).

	Turbidity.	Ammonia.			Nitrogen as—		Hardness.	Alkalinity.	Chlorine.
		Free.	Albuminoid.	Total.	Nitrites.	Nitrates.			
Dalecarlia inlet	89	0.011	0.120	0.131	0.005	0.58	58.2	53.6	2.1
Dalecarlia outlet	51	.017	.095	.112	.006	.54	60.5	54.0	2.1
Georgetown Reservoir, outlet	43	.010	.098	.108	.005	.56	58.5	53.8	1.0
McMillan Park Reservoir, outlet	29	.005	.054	.059	.005	.61	61.3	52.2	1.9
Filtered water	2	.006	.033	.039	.0004	.71	60.5	53.2	1.8

TABLE No. 9.

(A) TABLE SHOWING NUMBER OF DEATHS FROM TYPHOID FEVER, BY MONTHS, IN THE DISTRICT OF COLUMBIA FOR THE TWELVE FISCAL YEARS PRECEDING THE DATE OF THIS REPORT.

	1896 and 1897.	1897 and 1898.	1898 and 1899.	1899 and 1900.	1900 and 1901.	1901 and 1902.	1902 and 1903.	1903 and 1904.	1904 and 1905.	1905 and 1906.	1906 and 1907.	1907 and 1908.	Average.
July	8	10	24	9	20	16	21	17	16	15	21	10	15.6
August	15	16	22	58	41	33	39	26	22	30	32	18	27.7
September	25	18	22	30	29	28	25	18	25	23	21	17	23.1
October	25	10	28	28	25	21	32	19	14	26	25	19	22.7
November	18	9	21	27	28	22	19	8	11	14	17	11	17.1
December	16	18	16	26	17	16	20	14	9	6	4	7	14.1
January	13	8	10	17	7	19	9	5	11	6	7	4	9.7
February	4	4	4	6	2	8	5	5	1	4	6	1	4.2
March	4	2	7	8	8	12	9	6	5	5	4	1	5.8
April	4	9	6	10	2	9	6	10	7	4	6	8	6.7
May	6	6	3	5	4	13	6	8	1	10	7	8	6.4
June	9	20	6	12	10	9	3	8	3	9	2	3	7.8
Total	137	130	169	216	193	206	194	144	125	152	152	107	161.2

(B) PRECEDING TABLE OF TYPHOID DEATHS REDUCED TO DEATH RATES PER 100,000 INHABITANTS PER YEAR.

	1896 and 1897.	1897 and 1898.	1898 and 1899.	1899 and 1900.	1900 and 1901.	1901 and 1902.	1902 and 1903.	1903 and 1904.	1904 and 1905.	1905 and 1906.	1906 and 1907.	1907 and 1908.	Average monthly death rate.
July	35	43	102	37	82	64	83	66	61	56	69	35	61.1
August	65	69	93	158	167	132	153	100	83	111	105	61	108.3
September	109	78	93	125	118	112	98	69	95	85	69	60	92.5
October	109	43	119	116	102	84	126	73	53	97	82	67	89.2
November	78	39	89	112	114	88	75	31	42	52	56	39	67.9
December	70	78	68	108	69	64	79	54	34	22	13	25	57.0
January	56	34	42	69	28	75	35	19	41	22	24	14	38.3
February	17	17	17	24	8	31	19	19	4	15	20	4	16.2
March	17	8	29	33	32	47	35	23	19	18	13	4	23.2
April	17	38	25	41	8	35	23	38	26	15	20	28	26.2
May	26	25	12	20	16	51	23	30	4	36	24	28	21.6
June	39	85	25	49	40	35	12	30	11	33	7	11	31.4
Annual death rate	53	46	59	74	65	68	63	46	39	47	42	32	.....

PRELIMINARY TREATMENT OF POTOMAC WATER.

A series of observations on the appearance of city filtered water of different degrees of turbidity show that when viewed in a clear tumbler or carafe a turbidity of 1 destroys the brilliancy of the water. In an ordinary drinking glass a turbidity of 2 is noticeable, and one of 6 is decidedly objectionable.

The record of daily observations shows that since the filtration plant was first put in full operation on October 5, 1905, the turbidity of the filtered water has been 1 or more for 35 per cent of the time, 2 or more for 27 per cent, and 6 or more for 15 per cent. From this it is evident that the water has been unsatisfactory as to clearness for a large part of the time.

Experience has also demonstrated that a considerable rise in turbidity in the Potomac River is always accompanied by an enormous increase in the number of bacteria per cubic centimeter. This is clearly shown by the following table, giving the number of days on which records were taken when the turbidity of the water at the inlet of Dalecarlia Reservoir was between the limits given, and showing the corresponding average number of bacteria per cubic centimeter:

Turbidity.	Number of days.	Average number of bacteria per cubic centimeter.
1 to 99	27[illegible]	2,[illegible]10
100 to 499	[illegible]	1,[illegible]17
500 and higher	7	33,143

This coincidence of high bacterial counts with high turbidity persists throughout the system, as the following tables show:

Table giving the average number of bacteria in the water applied to the filters corresponding to turbidities stated.

Turbidity.	Number of days.	Average number of bacteria per cubic centimeter.
19 or less	105	178
20 to 39	165	796
40 to 59	48	2,054
60 to 79	15	6,220
80 to 99	7	6,614
100 or more	7	8,100

Table giving the average number of bacteria in the filtered water, corresponding to stated turbidities therein.

Turbidity.	Number of days.	Average number of bacteria per cubic centimeter.
1	114	21
2	28	61
3	34	44
4	24	50
5-7	30	136
8-10	8	244
11-20	3	573

Many standards of bacterial purity have been proposed, in which the allowable number of bacteria per cubic centimeter for a municipal water supply has been placed as low as 50 and as high as 500. In Washington the average number of bacteria per cubic centimeter in the filtered water since the filtration plant has been in operation has been 41.6. It has, however, exceeded 100 on thirty-seven days, and has, on one occasion, reached 900.

It is not believed that the slight turbidity in the water now furnished to consumers in the city of Washington has any direct injurious effect; there is no traceable relation between the high bacterial counts and the death rate from typhoid or other water-borne diseases. Still, water containing a large number of bacteria must be considered as below standard, and it is difficult to establish public confidence in a water supply whose impurities are visible to the naked eye for a considerable portion of the time. If it is possible to improve the conditions so as to supply at all times a clear water containing only a small number of bacteria, the remedy ought certainly to be applied.

There is, moreover, good reason to fear that if the fine particles of clay are allowed to penetrate deeply into the 40-inch layer of filter sand, or to pass entirely through it, there will ultimately result an accumulation of clay in the pores of the lower part of the filter layer which will reduce the general efficiency of the plant. At the Washington Filtration Plant the penetration of clay into the sand bed has, in many cases, caused a discoloration of the sand to a depth of more than 4 inches. So far as known, this condition has no precedent in the experience of other commercial filtration plants.

Three methods of remedying the defects have been suggested, viz, increased storage, preliminary filtration, and preliminary coagulation.

In order for preliminary storage to be effective, it would be necessary at least to double, and probably to treble, the present storage capacity of the system. To do this would require the purchase of such a large amount of land and the erection of such extensive works as to make the cost prohibitive.

Preliminary filtration would also be very expensive, but its adoption has been strongly urged. To determine the practicability of this method, an elaborate experimental plant was installed near Dalecarlia Reservoir, and experiments were also carried on at the Filtration Plant. After over a year's experimental work this office has been unable to discover any method of preliminary filtration already in use, or to devise a new method, by means of which the desired results can be accomplished.

The experimental station at Dalecarlia Reservoir also included a plant for experimenting with preliminary coagulation, and the results show conclusively that by this method the water supply of the city of Washington can at all times be satisfactorily purified, both as regards turbidity and as regards bacteria at a comparatively small cost.

All experiments were carried out under the immediate supervision of Mr. Francis F. Longley, chief chemist and assistant superintendent of the Washington Filtration Plant, who performed the work in a most thorough and satisfactory manner. The following has been condensed from his report:

The object of the experiments carried on during the past year was: First, to determine whether any means or devices could be found that would be capable of so preparing the Potomac water that, when applied to the sand filters, the final effluent would be equal in quality to that obtainable by the method of coagulation recommended in 1901 by Messrs. Hering, Fuller, and Hazen; second, to determine the improvement in quality that might be expected in the final effluent at the Filtration Plant, due to the application of the best of the preliminary processes tried.

At the experimental filter plant at the Dalecarlia Reservoir, there were installed a number of devices for the preliminary treatment of the water. In two of these, which have been designated as arrangements No. 1 and No. 2, respectively, mechanical principles alone were depended upon for the removal of objectionable matter. The essential feature of the third, designated as arrangement No. 3, was coagulation. These three arrangements were first thoroughly tried out, and later the experiments were varied in every way suggested to give further light on the problem.

The experimental filters were located just below Dalecarlia Reservoir. The water at this point has undergone one day of sedimentation, and will undergo about three days more before it reaches the filters. The rates of filtration, methods of cleaning, and all other details of operation of the experimental plant were in accordance with the best practice for the problem under consideration.

The turbidity of the final effluent from the coagulating arrangement was lower than from either of the mechanical devices, the total percentage of removals being, for No. 1 arrangement (mechanical), 96.8 per cent; for No. 2 arrangement (mechanical), 96.9 per cent; for No. 3 arrangement (coagulating), 99.6 per cent.

The superior removal by the No. 3 arrangement is more apparent from an examination of the following table, showing the percentage

of time when the turbidities in the final effluent of the several arrangements were between the limits stated:

		Turbidities.							
		0	1	2	3	4	5–9	10–19	20
Arrangement No. 1	Percentage of time.	0.5	69.2	12.3	7.2	4.4	5.4	0.5	0.5
Arrangement No. 2		1.2	65.1	12.1	6.3	4.8	9.0	.9	.6
Arrangement No. 3		65.8	31.5	2.7	.0	.0	.0	.0	.0

This shows that the mechanical devices tried proved entirely unsatisfactory for the removal of turbidity, while with the coagulating arrangement a practically perfect removal can be obtained.

The bacterial results from the coagulating arrangement were also decidedly better than those from either of the other two devices, the total percentage of removals being for No. 1 arrangement (mechanical), 97.1 per cent; for No. 2 arrangement (mechanical), 97.6 per cents; for No. 3 arrangement (coagulation), 99.1 per cent.

This is plainly shown by an examination of the following table, giving the percentage of time when the numbers of bacteria in the final effluents of the several arrangements were between the limits stated:

		Bacteria.			
		0–200.	200–400.	400–1,000.	1,000 or more.
	Percentage of time.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Arrangement No. 1		92.4	4.1	1.9	1.6
Arrangement No. 2		86.8	8.0	2.6	2.6
Arrangement No. 3		98.2	1.8	0.0	0.0

NOTE.—Arrangement No. 1 makes a better showing in this table than it is really entitled to, because, owing to the impossibility of washing the preliminary filter at such times, it was out of service during a number of the periods when the water was worst.

In the Washington problem a preliminary process is needed only when conditions are most adverse. Any process which fails at such times is useless for the purpose for which it was intended. The following table, giving the quality of the final effluents from arrangements 1, 2, and 3 during two short periods when the applied water was especially bad, show conclusively that arrangements 1 and 2 are not satisfactory and that arrangement 3 is satisfactory:

Date.	Turbidity of raw water.	Turbidity in effluent.					
		No. 1.		No. 2.		No. 3.	
		Preliminary filter.	Sand filter.	Preliminary filter.	Sand filter.	Coagulating basin.	Sand filter.
December 23	34	7	1	9	1	3	0
24	195	56	1	75	2	2	0
25	445	(a)	(a)	210	9	2	0
26	370	(a)	(a)	172	7	2	0
27	245	(a)	(a)	110	5	3	0
28	102	(a)	(a)	46	3	4	0
29	75	(a)	(a)	32	2	3	0
30	56	19	2	24	2	3	0
31	39	12	1	15	1	2	0

[a] Water too turbid to wash preliminary filter.

BACTERIAL RESULTS—EXPERIMENTAL FILTERS DURING PERIODS OF HIGH BACTERIA.

Date.	Bacteria per cubic centimeter.						
	Raw water.	No. 1.		No. 2.		No. 3.	
		Effluent preliminary filter.	Effluent sand filter.	Effluent preliminary filter.	Effluent sand filter.	Effluent coagulating basin.	Effluent sand filter.
December 20	1,400	300	100	500	160	1,300	220
21[a]	9,000	950	70	1,700	130	1,000	140
22				Holiday.			
26	51,000	(b)	.....	8,000	250	1,000	39
27	55,000	.....	.....	5,600	210	1,000	70
28	10,000	.....	.....	4,500	110	1,000	80
29				Sunday.			
30	4,400	.....	.....	1,500	190	700	80
31	14,000	.....	.....	1,500	60	1,200	65

Date.	Turbidity of raw water.	Turbidity in effluent.					
		No. 1.		No. 2.		No. 3.	
		Effluent.		Effluent.		Effluent.	
		Preliminary filter.	Sand filter.	Preliminary filter.	Sand filter.	Coagulating basin.	Sand filter.
January 12	10	10	1	12	1	2	0
13	110	45	2	51	2	2	0
14	210	95	3	113	4	2	0
15	325	190	12	222	15	3	0
16	360	210	37	215	12	5	0
17	242	122	21	147	26	6	0
18	137	.....	.....	73	7	6	0

[a] Began applying coagulant.
[b] No. 1 out of service at this critical time, owing to prohibitively high turbidity for washing preliminary filter.

BACTERIAL RESULTS—EXPERIMENTAL FILTERS DURING PERIODS OF HIGH BACTERIA.

Date.	No. 1.			No. 2.		No. 3.	
		Effluent.		Effluent.		Effluent.	
	Raw water.	Preliminary filter.	Sand filter.	Preliminary filter.	Sand filter.	Coagulating basin.	Sand filter.
January 12				Sundays.			
13	8,700	1,200	330	1,[illegible]	43	30	6
14	16,000	3,[illegible]	500	6,[illegible]	250	150	23
15	27,000	7,000	500	9,[illegible]	7[illegible]	1,500	19
16	25,000	8,[illegible]	1,000	11,[illegible]	[illegible]	1,000	14
17	65,000	15,000	1,[illegible]	20,[illegible]	1,[illegible]	1,[illegible]	23
18	7,000	.....	.....	6,[illegible]	[illegible]	1,000	14

A comparison of the bacterial removal effected by the preliminary process of the coagulating arrangement with the natural bacterial purification in the Georgetown and McMillan Park reservoirs, which lie between the proposed point of application and the filtration plant, is of interest in this connection. This is given in the following table, from which the advantage of the coagulating process is evident. The conditions following coagulation are characterized by a sharper and greater reduction of bacteria than takes place from natural causes in the two reservoirs.

Date.	Duration.	Per cent removal in the two reservoirs.	Per cent removal in coagulating basin.
1907.	*Days.*		
March 5-8	4	51.8	85.8
November 22-29	8	86.0	90.3
December 11-16	6	57.0	98.1
December 26-29	4	90.4	97.2
1908.			
January 9-17	9	69.1	96.5

We may fairly conclude, therefore, from the data presented that the mechanical devices under investigation are incapable of giving at all times the bacterial removal desired, and from the same data, supplemented by the records of operation of a number of successful purification plants in which coagulation is an essential factor, we may conclude that this process applied to the preliminary treatment of Potomac water will give a bacterial removal satisfactory in all respects.

The coagulant used in these experiments was aluminum sulphate. A reasonably definite relation was established between the turbidity and the quantity of coagulant required for its removal. Tentative turbidity limits, for purposes of estimate, were set above which coagulant will have to be applied. Both of these points, however, may have to be revised and more definitely determined in practical application of the process.

Aluminum sulphate is the coagulant that is best known and most commonly used. Other chemicals have been successfully used or suggested to accomplish the same result, but their advantages over aluminum sulphate, in economy and efficiency, are questionable. It is proposed, therefore, to use aluminum sulphate in this case. If at any time in the future it seems advisable, other coagulants may be tried out in practical operation for purposes of comparison.

As heretofore stated, the primary object of these experiments was to determine whether any preliminary process involving purely mechanical means for the removal of the impurities in the water at times of high turbidity would be found as effective in that removal as coagulation and sedimentation. The results demonstrate clearly the entire insufficiency of the mechanical process at the very time when most needed. They add convincing evidence to the mass of data that has resulted from the successful operation of many coagulating plants, showing the unfailing applicability of this method of treatment for the purpose stated.

In order to meet the objections to the use of aluminum sulphate advanced in previous discussions of this subject, the relation between the quantity of aluminum sulphate required and the turbidity of the water was determined.

When aluminum sulphate in solution is applied to a water containing carbonates of calcium and magnesium in solution, a certain definite quantity of aluminum sulphate will be decomposed by each part of calcium or magnesium carbonate in the water. The application of 100 pounds of 17 per cent sulphate to 1,000,000 gallons of water will cause the decomposition of 6 parts per million of dissolved carbonates

of calcium or magnesium. From this definite relation and from the results of tests for hardness in Potomac water that have been carried on at the filtration plant continuously since October, 1905, it may be positively stated that under the least favorable conditions that have existed since that date 516 pounds of aluminum sulphate per million gallons of water could have been applied to the water supply of the city of Washington without the slightest trace of aluminum sulphate remaining in the water that reached the filters. During the period of experimentation near Dalecarlia Reservoir it was determined that under the most unfavorable circumstances that will with any reasonable probability occur, the maximum quantity of aluminum sulphate that need ever be applied to the Potomac water in order to prepare it for filtration at the existing filtration plant is 360 pounds per million gallons, well within the safe limit.

The results of eleven months of operation of the experimental plant have demonstrated the following facts:

(1) The desired removal of turbidity and of bacteria from water taken from the outlet of Dalecarlia Reservoir can not be effected by means of devices of the type of arrangements 1 and 2.

(2) The evidence tends to show, and there is every reason to believe, that this removal can not be effected by any device, applicable to large quantities of water, that involves only mechanical principles in its operation.

(3) The desired improvement in the water can be effected by occasional coagulation, with subsequent thorough sedimentation in the two existing reservoirs. This process is so entirely flexible that with its use the perfect final product of the filters so much desired is assured.

Consideration of the chemical results of coagulation, and of the other pertinent facts presented, leads to the conclusion—

(4) That the application of aluminum sulphate to the Potomac water, as proposed, does not present the slightest menace to the public health of the District of Columbia.

COST OF COAGULATION.

The use of a coagulant will necessitate the construction of a storehouse and plant for applying it, the estimated cost of which is $23,000. It will also necessitate the remodeling of the Georgetown Reservoir, in order that it may be readily cleaned; the estimated cost of this work is $108,000. It is recommended that the available free balance of the appropriations for construction of the Washington Aqueduct, District of Columbia, Filtration Plant, amounting to about $41,000, be made immediately available for these works, and that an additional sum of $90,000 be appropriated therefor.

The present method of measuring the turbidity of the water was adopted on November 1, 1905. Based on the information obtained since that date, it is estimated that cost of coagulant since that period would have been as follows:

For the fiscal year 1906	$6,300
For the fiscal year 1907	7,100
For the fiscal year 1908	8,300

An estimate of $9,000 is submitted for the purchase of coagulant for the fiscal year 1910. The estimate is made liberal to allow for the recurrence of periods of excessive turbidity such as have occurred prior to the periods above mentioned.

Experience extending over many years in a large number of American cities has shown that no injurious sanitary effect need ever be feared from the use of a coagulant applied to the water under reasonable and constant chemical supervision, such as would be employed in this case. The use of alum would be limited to the days, estimated to number from thirty to sixty a year, on which the water contained an excessive amount of impurities; there would be no increase in its hardness, the alum would disappear chemically, and the alumina, which may be regarded as the active principle of the coagulant, would be entirely removed in the course of purification; the city water should contain no more of it than if coagulation had never been resorted to. That this method of preliminary treatment of the water would be necessary was the opinion of the experts upon whose recommendation the system of slow sand filtration was finally adopted.

Experience since the filtration plant was first put in operation has shown that Washington is being supplied with a good and wholesome water. It has also shown that there is still room for improvement in certain directions. The experiments conducted in the past year and a half have shown how such improvement can be effected, and they have demonstrated that Washington can be at all times supplied with a water that is unexceptionable both in quality and appearance.

It is urgently recommended that appropriations necessary to effect this improvement be made.

AMOUNT AND DATE OF APPROPRIATIONS FOR THE WORK.

	Appropriated.	Reverted to appropriation or to Treasury.
March 2, 1905 (allotment)	$70,000.00	$21,539.78
June 27, 1906	80,000.00	.....
March 2, 1907	90,000.00	1,175.[illegible]
May 26, 1908	82,000.00	.....
Total	322,000.00	.....

ABSTRACT OF CONTRACTS IN FORCE.

Contractor: Ward W. Griffith, for bituminous coal.
Date of contract: September 30, 1907.
Approved: October 12, 1907.
Date of commencement: November 13, 1907.
Date of completion: Before July 1, 1908.
Amount and rate: Furnishing and delivering 4,000 tons bituminous coal, at $5.75 per ton.

Money statements.

MAINTENANCE WASHINGTON AQUEDUCT, D. C., FILTRATION PLANT, 1907.

July 1, 1907, balance unexpended	$9,166.72
June 30, 1908, amount expended during fiscal year	7,991.39
July 1, 1908, balance unexpended	[a] 1,175.33

MAINTENANCE WASHINGTON AQUEDUCT, D. C., FILTRATION PLANT, 1908.

June 30, 1908, amount expended during fiscal year	$72,630.66
July 1, 1908, balance unexpended	17,369.34
July 1, 1908, outstanding liabilities	6,093.42
July 1, 1908, balance available	11,275.92
July 1, 1908, amount covered by uncompleted contracts	3,654.68

[a] Balance of $1,175.33 deposited in Treasury of the United States, January 23, 1908 (reverted and dropped).

APPENDIX G G G.

IMPROVEMENT AND CARE OF PUBLIC BUILDINGS AND GROUNDS IN THE DISTRICT OF COLUMBIA—WASHINGTON MONUMENT.

REPORT FOR THE FISCAL YEAR ENDING JUNE 30, 1908. OFFICER IN CHARGE, COL. CHAS. S. BROMWELL, U. S. ARMY.

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OFFICE OF PUBLIC BUILDINGS AND GROUNDS,
Washington, July 18, 1908.

GENERAL: I have the honor to submit the following report of operations upon public buildings and grounds in the District of Columbia under the Chief of Engineers during the fiscal year ending June 30, 1908:

Besides the care of public buildings and grounds and the Washington Monument, this Office has also been charged with additional duties, as follows.

1. The preservation, care, and safety of buildings occupied by the War Department in the District of Columbia, except the State, War, and Navy Departments building.

2. The care and repair of the Government telegraph line connecting the Capitol with the various Departments and with the Government Printing Office.

3. The immediate charge of the banks of the Potomac River from the north line of the arsenal (or Washington Barracks) grounds to the southern curb line of N street SW.

4. Care of the building on Tenth street NW. where Abraham Lincoln died.

5. The monument at Wakefield, Va., the birthplace of Washington, and the iron pile dock at the mouth of Bridge Creek, Virginia.

6. The erection in the national military park at Gettysburg, Pa., of a memorial tablet to Abraham Lincoln.

7. Executive and disbursing officer of the Sheridan Statue Commission.

8. Since March 6, 1901, executive and disbursing officer of the Grant Statue or Memorial Commission.

9. Since August 11, 1901, in charge of the portion of Potomac Park between the tidal reservoir and the Washington Monument grounds, and between Seventeenth street and Virginia avenue NW., and Maryland avenue and Fourteenth street SW., called hereafter Monument Park Annex; since November 25, 1903, of the portion between the Virginia channel of the Potomac River, the tidal reservoir, and the causeway of the Pennsylvania Railroad Bridge; since June 11, 1906, in charge of the portion between the tidal reservoir and the sewer canal; and since April 4, 1907, in charge of a strip of section 1 of Potomac Park about 165 feet wide adjacent to sea wall on Potomac River side and extending from the mouth of the Seventeenth street sewer canal northwestwardly to the mouth of the Easbys Point sewer at foot of Twenty-third street NW.

10. Since July 26, 1902, in charge of the erection of a monument at Fredericksburg, Va., to the memory of Gen. Hugh Mercer.

11. Since December 17, 1903, executive and disbursing officer of the Pulaski Statue Commission, and of the Von Steuben Statue Commission.

12. Since May 6, 1904, executive and disbursing officer of the Jefferson Statue Commission.

13. Since June 22, 1906, executive and disbursing officer of the Barry Statue Commission.

14. Since December 24, 1906, executive and disbursing officer of the Longfellow Statue Commission and executive officer of the Kosciuszko Statue Commission.

15. Since May 18, 1907, executive and disbursing officer of the Columbus Memorial Commission.

16. Since April 16, 1908, executive and disbursing officer of the John Paul Jones Statue Commission.

17. Since May 29, 1908, executive and disbursing officer of the Witherspoon Statue Commission.

ORDINARY CARE, REPAIR, AND REFURNISHING OF THE EXECUTIVE MANSION.

Care of mansion.—The work required to maintain the house in a neat and cleanly condition was extended throughout the year. The hard-wood floors in particular require much attention in the way of cleaning, waxing, etc., to keep them in good condition, and this was done in a regular and systematic manner. The tile floors in the entrance vestibule and in the main corridor on drawing-room floor were also looked after and kept in perfect condition. A new wooden floor was laid in flower room in West Terrace.

Carpentry repairs.—Locks and hinges were repaired, doors rubbed down, twenty-two new wire window screens and four new wire door screens were made, and broken window glass replaced with new glass.

Plumbing.—Attention was paid to the plumbing fixtures and minor repairs made to them as required. A new slop sink was placed on second floor in place of a broken one. The large water filter was regularly cleaned and new filtering material supplied. The down spouts on the roof were also regularly cleaned. In June, 1908, pipe was run and connected with the house water system to afford facilities for cooling the roof over that portion of the attic occupied by the servants. The southeast toilet room on second floor was retiled, the plumbing fixtures reset, and a new closet hopper and seat and a new wash-basin slab and backs put in in place of the old ones. New seats were also placed on the other closet bowls where required. The large water tank on the roof which supplies the house fixtures was cleaned out.

Lighting, etc.—Attention was paid to the lighting system, and repairs made as needed. Burned-out electric lamps were replaced with new lamps. The candelabra in the East Room were cleaned. Some minor repairs were made to the electric elevator, and all of the machinery connected with it was maintained in good condition. Thirty-five feet of 2-inch iron pipe were run to drain the cement box in which one of the gas meters sits.

Heating.—All the chimneys were cleaned and the ranges in the kitchens were also cleaned and necessary repairs made. The old tubular hot-water boiler was taken out and a new sectional hot-water boiler installed in its place. A new hot-water radiator was placed in the butler's pantry. Repairs were made to one of the hot-water pipes in pipe conduit under ground floor corridor, and the conduit was cleaned and whitewashed. Two hot-air registers were removed from one of the rooms on ground floor and the openings bricked up. The hot-air flues leading to the southwest rooms on second floor were lined with tin.

Painting exterior.—The work of repainting the exterior of the mansion, which was commenced in June of 1907, was completed in September, 1907. In doing this work, the old paint was first burned off from the entire surface of the north front, from about two-thirds of the surfaces of the east and west fronts, and from about one-fourth of the surface of the south front. A priming coat of paint was given to all the surfaces from which the old paint had been burned, and when this was dry, the other coats were successively applied. Two and three coats were placed on top of the priming coat, as required. The roof balustrade was scraped and painted with two coats of paint, the skylights, ventilators, and chimneys were also given two coats, and the roof of the mansion and the wooden walks on it were painted with one coat of green paint. The painting of the mansion included the East and West Terraces, or wings, the exteriors of which were given two coats of paint, including the colonnade of the former, the passageway on the south side of the latter, and the electric-light posts, forty wooden plant boxes, and their iron and tile cases, and sixty-seven large boxes which hold the bay trees, on the roofs of both terraces.

Painting interior.—The following in the interior of the mansion were painted: The walls, ceiling, and woodwork in one bathroom, the walls and ceiling in one room, the ceilings in two rooms, and the woodwork in one room, all in the attic; the woodwork on elevator landing, second floor, and the iron railing of service stairway from

attic to ground floor; the window sills and washboards in northeast room, the washboards in three rooms, the outside surfaces of three bath tubs, all on second floor; the centers of all the panels in the East Room, and the washboards and the panels of the wainscoting on main stairway; eight doors on parlor floor were painted, grained, and varnished, and the remaining doors on that floor were touched up and varnished; the walls of one toilet room, the walls, ceilings, and woodwork in steward's room and in one room adjoining, three doors in corridor, all on ground floor; the woodwork in passageway between West Terrace and Cabinet room; the ceiling of the cloak room in East Terrace, and part of the wall and ceiling of vestibule at west end of same; the walls of the ground floor corridor were touched up, and four radiators in the colonnade of East Terrace were bronzed.

East Terrace roof.—As stated in last annual report, the contractors who placed a new roof on the East Terrace in the autumn of 1906, which proved defective, commenced operations in June, 1907, for replacing the work without extra expense to the United States, and completed the work in a satisfactory manner by September 1, 1907, and the amount due them under the contract was paid.

Furniture and furnishings.—The furniture was overhauled and cleaned, frames rubbed down, and necessary repairs made; all the burlap-covered walls and the frames of pictures were cleaned, and window shades and carpets repaired. The draperies were rehung in the autumn of 1907 and taken down, cleaned, and packed away in June, 1908, for the summer. Linen slip covers were placed on the furniture for the summer months. Seven new plush-lined wooden cases were made for holding the seven gilt and glass pieces which make up the plateau used as a centerpiece on the state dining table, and this centerpiece was thoroughly repaired, defective mirror parts replaced, and the metal parts regilded, making the entire plateau equal to new. The furniture in the ushers' room was reupholstered. New damask window curtains and a new damask drapery were purchased for southwest bedroom, and the furniture in the room, consisting of one sofa, four chairs, two screens, two window seats and valances, and six pillows, were re-covered. Slip covers were made for thirteen divans in East Room and four in ground floor corridor. In the northwest dressing room the cretonne covering was removed from the walls, cleaned, and used to re-cover the furniture from which the old covering had been removed. The walls of the room were pointed up and papered. The portierres were taken apart, cleaned, and remade.

Social functions.—The work devolving upon this office in connection with these functions was performed in November and December, 1907, January, February, March, April, and May, 1908. These functions were: Two teas, six dinners, three day receptions, four night receptions, and five evening musicales. For the night receptions the furniture was removed from the rooms on the drawing-room floor and attendants provided for the hat and cloak boxes and the dressing rooms on the ground floor. This latter was also done for the musicales, and in addition chairs placed in the East Room for the guests. For the dinners the tables were placed in position, and the usual floral decorations provided. After all of these functions the house was restored to its usual condition. For use at the night functions an elec-

tric carriage call was purchased and placed upon the roof of the East Terrace, and two sets of telephones, with necessary connections, put up temporarily for calling carriages at the south entrance. These were all removed when no longer needed.

Inventory of property.—Sundry civil act approved April 17, 1900 (vol. 31, p. 97), provides:

And hereafter a complete inventory, in proper books, shall be made annually by the steward, under the direction of the officer in charge of public buildings and grounds, of all the public property in and belonging to the Executive Mansion, showing when purchased, use to which applied, cost, condition, and final disposition to be submitted to Congress with annual report of officer in charge of public buildings and grounds.

In compliance with this law an inventory has been made and is submitted with this report as Appendix A. It shows the total quantity of property on hand at the close of the fiscal year ending June 30, 1907, the quantity purchased during the year, what was disposed of during that period, and the total quantity on hand June 30, 1908.

Executive office building.—The exterior of the building was painted with two coats of paint, and in the interior the woodwork was painted, with the exception of that in the President's office room and the Cabinet room. Six radiators in the lobby were rebronzed. The roof was painted. The heating boiler was cleaned and painted. Attention was given to the plumbing and broken parts replaced with new. Locks on furniture were repaired and new keys fitted, some new shelving placed in the basement, a clothes closet made, and broken window glass replaced with new glass.

Stable of Executive Mansion.—The stable was thoroughly fumigated and four 18-inch and one 12-inch "Star" ventilators put in to ventilate the stall rooms. The top floors in all the stall rooms were taken up, a waterproof covering spread on the bottom floor and all the top floors relaid while the waterproofing was still wet. The sheathing under the tin on the roof over the washing floor between the carriage houses was repaired and the tin replaced and repaired. The wooden and glass front of the wash floor was repaired and painted. The walls and ceilings of four living rooms on second floor were repapered and the woodwork painted. Minor repairs were made to doors, racks, and windows. Some painting, graining, and varnishing was done on second floor and some painting was also done on first floor in the stall rooms. The interior of the north carriage house, the interior of the harness room, the ceiling and doors of the inclosed wash floor between carriage houses and the roof of building were painted. Broken glass was replaced with new glass and repairs made to gas pipes and fixtures.

Stable of Public Buildings and Grounds.—The floor of carriage room was painted and broken glass in windows was replaced with new glass.

Greenhouses, Executive Mansion.—These houses are located at the Propagating Gardens on the Monument grounds. Necessary care was extended to the collection of plants, and they were maintained in good condition. Decayed woodwork of plant benches and other parts of the houses was torn out and replaced with new materials and painted. Other necessary painting was done and broken glass replaced with new glass. Heating boilers were overhauled, repairs

made, and smokestacks and flue pipes cleaned. Iron braces were placed in two rose houses to strengthen the roofs, some wooden footwalk was laid outside of houses. The hot-water pipes in House No. 1 were reset on new brick piers built for the purpose. The heating pipes in House No. 5 were changed from the floor to overhead system, and the brick walls of conduit under center bench were heightened. The old tubes in large steam boiler were replaced with new ones and the brickwork of the boiler reset. The valves on heating pipes were repacked. The steam pipe in conduit was covered with asbestos, the walls of the conduit heightened and a flagstone top placed upon it.

Grounds of the Executive Mansion.—The grounds were maintained in good condition. Lawns were mown, roads, walks, sidewalk pavements, gutters, and drain traps cleaned. The macadam roadway at north front was repaired with crushed stone as required. Bare places on lawns were sodded and other places seeded. In the late autumn 165 cartloads of stable manure were spread on the lawns and used as a mulching around young trees and shrubs. This was raked in in the spring and the refuse removed. Bone meal was sown in the spring over those portions which had not been treated with manure.

In the Colonial Gardens south of the East and West terraces the grass was cut, gravel walks rolled, cobblestone gutters cleaned, hedges trimmed, climbing roses and vines tied, dead and broken limbs removed from trees and shrubs. In the late autumn the bay trees on the roofs of the East and West terraces were taken down, hauled to the Propagating Gardens, and placed in the bay tree house for the winter. Their places on the terraces were filled during the winter and early spring months with evergreen trees in tubs and boxes, which were hauled from the Propagating Gardens for the purpose.

In accordance with usual custom the grounds were opened to the children on Easter Monday, April 20, 1908, from 9 o'clock a. m. until 1 o'clock p. m. for the "egg rolling." After the grounds were closed they were cleaned up and the rubbish removed. The cost of this extra cleaning, and the work which was done in putting up the wire protection for the shrubbery, etc., amounted to about $23.

HOUSE NO. 516 TENTH STREET NW., WHERE ABRAHAM LINCOLN DIED.

This property was purchased by the United States in November, 1896, since which date it has been under the supervision of this Office.

By authority of the Secretary of War, dated October 9, 1899, Mr. O. H. Oldroyd is allowed to occupy this building with his family as custodian, without pay, and to exhibit his Lincoln Museum and to charge a small entrance fee therefor.

The following repairs were made to this building during the year:

The back porch on the first floor was inclosed with a wood and glass partition, which was painted. Minor repairs were made to doors, windows, and blinds, to the plumbing fixtures in kitchen and bathroom, and to the steam-heating pipes. A new platform was put in the areaway back of the boiler room.

BUILDINGS OCCUPIED AS OFFICES BY THE WAR DEPARTMENT, EXCEPT STATE, WAR, AND NAVY DEPARTMENT BUILDING.

By order of the War Department, dated June 30, 1893, all buildings occupied as offices by the War Department, except the State,

War, and Navy Departments building, were placed under the charge of this Office, so far as their preservation, care, and safety are concerned. Between July 1, 1907, and June 30, 1908, the buildings thus occupied were twelve in number, as follows:

Army Medical Museum and Library, Seventh and B streets SW.

Ford's Theater building, 509-511 Tenth street NW., Adjutant-General's Office, War Department.

No. 610 Seventeenth street NW., Adjutant-General's Office, War Department.

No. 532 Seventeenth street NW., office depot quartermaster, United States Army, and photograph gallery, office Chief of Staff.

No. 1725 F street NW., branch printing office, War Department.

No. 1712 G street NW., publication branch, Adjutant-General's Office, War Department.

No. 1744 G street NW., Board of Ordnance and Fortification, Signal Office, Military Division, etc.

No. 1720 H street NW., Medical Dispensary, United States Army.

Annex to Winder Building, Ordnance Department, United States Army.

War Department stables, G street, between Seventeenth and Eighteenth streets NW.

Lemon Building, No. 1729 New York avenue NW., occupied by Supply Division, War Department, office Public Buildings and Grounds, Signal Office, etc., Division of Military Information of General Staff, Post Paymaster.

No. 1800 F street NW., occupied as an annex to the Insular Bureau of the War Department.

Monthly inspections have been made of these buildings during the year, and they are believed to be in good and safe condition for the purposes for which they are being used.

GOVERNMENT PRINTING OFFICE.

During the year, at the request of the Public Printer, and by direction of the Chief of Engineers, three examinations were made by this Office of the buildings of the Government Printing Office, and reports made in relation thereto as follows:

In the latter part of January and the fore part of February, 1908, an investigation was made as to the strength of the floors of the old building (H street wing) and a report as to the same submitted on February 4, 1908.

In the latter part of March, 1908, the south walls of the old building facing on Jackson alley were carefully examined as to their safety, and a report thereon submitted on March 28, 1908, with recommendation for strengthening the walls.

On June 16, 1908, I was detailed by the Chief of Engineers, by authority of the Secretary of War, to make an immediate inspection of the buildings of the Government Printing Office, i. e., the new building, the old building, the H street annex, and the engine and boiler rooms, as to the safety of the walls and the loads carried on each floor; also to inspect the sewer connections with a view to prevent flooding of the basement. The inspection was at once commenced, prosecuted as rapidly as possible, and a report covering the entire subject submitted on June 25, 1908.

SIXTH STREET STATION OF PENNSYLVANIA RAILROAD.

On March 4, 1908, this Office, by direction of the War Department, assumed charge of this building, erected at the southwest corner of Sixth and B streets NW., in Henry Park, which had been transferred by the railroad company to the Secretary of War on behalf of the United States, under the act of Congress approved February 28, 1903,

providing for a new union railroad station in this city. On April 21 the assistant engineer of the Pennsylvania Railroad in this city, by letter addressed to the Secretary of War, stated that his company, in connection with the transfer of their old station building to the United States waived any and all claims supposed to be vested in the company on account of the overhead bridge across Sixth street, south of the station building. This Office thereupon assumed charge of the bridge.

On June 5, 1908, the President issued an Executive order (No. 803) ordering the officer in charge of Public Buildings and Grounds to remove or sell at public auction for removal the station building and its appurtenances. Proposals were thereupon advertised for for taking down the building and purchasing the materials of which they were composed. The bids were opened on July 6, 1908, and a contract entered into on July 9, 1908, with the highest bidder for doing the work and purchasing and removing the materials for the sum of $1,315. The contract provides that the work shall be commenced within ten days of the date the contract is signed, and be completed within sixty days thereafter.

WASHINGTON NATIONAL MONUMENT.

The usual care was extended to protect the shaft and keep it clean. The stairways, landings, railing, and waiting rooms were swept or otherwise cleaned, and the marble walls on top floor and on landing 49 were cleaned, and the tablets in the interior walls dusted. All machinery connected with the elevator was inspected, oiled, and cleaned each day before starting to carry passengers, and twice each week the safety appliances on the elevator car were tested, all by the employees at the Monument. In addition to this, the elevator and all machinery connected with it were inspected once each month by an agent of the Casualty Company, with whom an agreement is in force for that service.

The two old cast-iron sheaves at the top of the shaft on which the cables of the elevator car and the counterweights run and which had become much worn were taken out and replaced with two new cast-steel sheaves, steel shafts, and cast-iron journal boxes, the work being done under contract. The work of taking out the old sheaves was begun on September 16, and the new sheaves were in place and everything in complete running order by the afternoon of September 20, 1908. During the five days that this was going on the Monument was closed to visitors and was reopened to the public at the usual hour on the morning of September 21. In June, 1908, new governor gears and shaft for same were put in place in the cable drum of the elevator to replace old gears no longer serviceable. The woodwork in the waiting room on bottom floor and around its doorway, the ironwork at entrance to elevator car, and the windows at top were painted. The walls of the shaft at the bottom floor at the rear of the waiting room were plastered.

In the motor room the machinery was carefully overhauled, regularly inspected, and maintained in good condition. The old wooden floor, which was rotting out in places, was taken up and replaced with a cement floor and washboards of same material.

At the power house the outside doors, window sash, and all outside iron and tin work were painted; 13 feet of 4-inch cast-iron drain pipe

were run to connect downspouts to sewer; a cement apron was constructed at rear end for handling ashes from boiler room, and a new asphalt pavement laid over roof of the coal bunker. Such machinery as required it was painted and new brass bands were placed around pipe covering where needed. The interior walls of brick and stone were whitewashed; the woodwork of windows, doors, and door frames, the ventilator on roof, and the floors cleaned and repainted. One of the two boilers was in alternate use every other month, so that each boiler was in commission six months of the year. During the month that each boiler was not in use it was opened up and washed out, the front and back connections cleaned, tubes brushed, and scale removed. The fronts of the boilers were painted twice during the year. New awnings were put up at four of the windows.

At the lodge house the boiler and the steam and water pipes in boiler pit were cleaned, the back walls therein and women's toilet whitewashed, the furnaces painted, and repairs made to the plumbing fixtures in men's toilet room, a new bowl and flush tank having been put in. A new tin roof was put on the building and painted, new sheathing being put under the tin where the old sheathing had rotted away. A new lavatory was put in office room, the ceiling and walls of waiting room were painted, the woodwork varnished, and three radiators bronzed. Gas was introduced into the building, 1-inch gas pipe having been run to it from the main on Fourteenth street, a meter set and connected, and gas fixtures placed in position.

Seven arrests were made during the year—two drunks, two for defacing monument, two for disorderly conduct, and one committing a nuisance. The collateral forfeited amounted to $55.

The following table shows the number of visitors to the top of the monument each month during the year, both by the electric elevator and by the stairway, the total number during the year, and the aggregate number since the shaft was opened to the public, October, 1888:

Month.	Number by the electric elevator.	Number by the stairway.	Total.	Aggregate since October 9, 1888.
1907.				
July	17,959	2,818	20,777	2,888,399
August	22,021	7,603	29,624	2,918,023
September	15,504	7,712	23,216	2,941,239
October	21,506	4,789	26,295	2,967,534
November	13,080	2,020	15,100	2,982,634
December	8,659	1,439	10,098	2,992,732
1908.				
January	9,064	1,227	10,291	3,003,023
February	6,551	1,688	8,239	3,011,262
March	11,524	2,096	13,620	3,024,882
April	16,176	3,363	19,739	3,044,621
May	12,408	1,761	14,169	3,058,790
June	11,862	1,688	13,550	3,072,340
Total	166,314	38,404	204,718	.....

Data relative to Washington Monument.

Height above mean low water	596 feet 4¾ inches
Height above doorsill	555 feet 5⅛ inches
Side of base—outside	55 feet 1½ inches
Side of base—inside	25 feet
Depth of foundation (sand and clay)	38 feet
Foundation on a side	126 feet 6 inches
Area	16,002.25 square feet
Top side of monument—outside	34 feet 6 inches
Top side of monument—inside	31 feet 6 inches

Walls, thickness { base	15 feet ¼ inch
Walls, thickness { top	18 inches
Weight of capstone	3,300 pounds
Weight of whole monument	81,120 tons
Mean pressure at base	5 tons per square foot
Pressure on foundation nowhere greater per square foot than	9 tons
Near edges, less than	3 tons
(Coast Survey Report, December 1, 1884.)	
Taper of monument	¼ inch to 1 foot
Memorial stones (beginning at 30 feet, stopping at 280 feet)	179
Steps	898
Landings	50
Windows, at top only	8
Six are 3 feet by 1 foot 4 inches.	
Two are 3 feet by 2 feet.	
Cost	$1,300,000
Corner stone laid July 4, 1848.	
Capstone set December 6, 1884.	
Dedicated February 21, 1885.	
Elevator, electric, time of travel	5 minutes
Elevator load	35 persons
Weight of car empty	5,670 pounds
Weight of car loaded, 35 persons (1 person equals 150 pounds)	10,920 pounds
Weight of counterweight	8,040 pounds
Cables	1½ inches diameter
Dynamo	50 kilowatts, 250 volts
Engine, double worm.	
Speed of elevator, 100 feet per minute.	
Engine governor throws off current at 105 feet per minute.	
Car safety stops car at 150 feet speed per minute.	
Elevator tested at 6 tons.	

IMPROVEMENT OF PUBLIC RESERVATIONS IN THE DISTRICT OF COLUMBIA.

The work of the Office of Public Buildings and Grounds is divided as follows:

1. Clerical department.
2. Horticultural department.
3. Engineering department.
4. Police department.
5. Executive Mansion, greenhouses, and grounds.
6. Washington Monument.
7. Departmental telegraph.

For the purposes of administration all the parks under this Office are divided into three divisions, viz:

East division: All east of North and South Capitol streets.

Northwest division: All west of North Capitol street and north of B street north.

Southwest division: All west of North and South Capitol streets and south of B street north.

The area covered by the park spaces of the District of Columbia under the charge of this Office is 472.985 acres.

There are in all 314 reservations, varying in size from 250 square feet to 82 acres. They are classified as follows:

	Number.	Acres.
Highly improved	108	361.698
Partially improved	120	23.474
Unimproved	86	87.813
Total	314	472,985

During the year two park spaces were added to the system by the transfer to the Chief of Engineers by the Commissioners of the District of Columbia of the following parcels of ground under authority granted by section 2, paragraph (*b*) of the act of Congress approved July 1, 1898 (volume 30, Statutes, page 570):

Number given to reservations.	Location of reservation.	Area in square feet.	Date of transfer.
303 AB	Connecticut avenue, between Kalorama avenue and the entrance to Connecticut Avenue bridge over Rock Creek.	9,320.47	Apr. 27, 1908.
303 C	Connecticut avenue, at the entrance to Connecticut Avenue bridge over Rock Creek.	4,156.86	Do.

The following-described grounds were transferred by the Chief of Engineers to the Commissioners of the District of Columbia under the operations of section 4 of the law quoted:

September 23, 1907: Reservation 203, Maryland avenue, First and A streets NE. A strip 5 feet wide the length of the reservation on its Maryland avenue side, for sidewalk purposes.

September 23, 1907: Reservation 204, Maryland avenue, Second and B streets NE. A strip 5 feet wide the length of the reservation on its Maryland avenue side, for sidewalk purposes.

November 22, 1907: Reservation 116, Virginia avenue, Sixth and B streets SW. A strip 3 feet wide the length of the reservation on its Virginia avenue side and a strip 18 inches wide on its Sixth street side, for sidewalk purposes.

Between July 1, 1907, and June 30, 1908, part of the $25,000 appropriated for "Improving various reservations" was devoted to improving five reservations hitherto unimproved, containing 0.457 (nearly one-half) of an acre. These improvements consisted in a general way of grading, soiling, seeding, making flower beds, and introducing water. The reservations referred to are shown on the accompanying table, which also shows those improved in the ten preceding years.

Reservations improved during the fiscal years given.

1897-98.				1898-99.				1899-1900.			
Unimproved.		Previously partially improved.		Unimproved.		Previously partially improved.		Unimproved.		Previously partially improved.	
No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
85	0.173	29	0.329	61	0.050			19	3.020	61	0.050
207	.073	31	.338	140	.160			47	.025	154	.273
211	.105	193	.215					77	.853	163	.176
		194	.131					98	.198		
								99	.112		
								100	.141		
								102	.097		
								122	.865		
								123	.394		
								125	.414		
								126	2.102		
								134	.216		
								163	.176		
								187	.092		
								195	.288		
								206	.111		
								208	.085		
								210	.249		
								211	.105		
								212	.094		
								213	.076		
3	.351	4	1.013	2	.210			21	8.713	3	.499

Reservations improved during the fiscal years given—Continued.

1900-1901.				1901-2.				1902-3.	
Unimproved.		Previously partially improved.		Unimproved.		Previously partially improved.		Unimproved.	
No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
78	0.108	57	0.055	73	0.014	78	0.108	155	0.004
79	.027	62	.220	81	.003			255	.015
124	.224	64	.315	82	.102			275	.002
159	.152	188	.085	112	.199				
160	.058	206	.111	128	.051				
165	.056			143	.022				
166	.072			146	.126				
180	.148			147	.087				
191	.171			148	.094				
192	.196			177	.012				
201	.507			178	.164				
209	.103			182	.108				
239	.375			183	.108				
251	.250			184	.174				
259	.124			196	.118				
260	.088			229	.224				
266	.131			276	.020				
267	.145			277	.017				
271	.015			285	.211				
277	.259								
20	3.169	5	.886	19	1.974	1	.108	3	.021

1903-4.				1904-5.				1905-6.		1906-7.	
Unimproved.		Previously partially improved.		Unimproved.		Previously partially improved.		Unimproved.		Unimproved.	
No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.	No.	Acres.
189	0.052	37A	1.657	143A	0.040	309	0.325	57C	0.226	309A	0.234
269A	.018	37B		143B	.017			126	1.994	309B	.092
		38A		177A	.040			270A	.051		
		41A		186	.166						
		41B		262	.017						
		44A		263	.040						
		65A	.193	277C	.053						
		188A	.785	300	.079						
		189A									
		277B	.020								
2	.070	10	2.655	8	.482	1	.325	3	2.271	2	.326

1907-8.	
Unimproved.	
No.	Acres.
57D	0.048
180	.008
303AB	.214
303C	.095
305A	.092
5	.457

In addition to the foregoing, a macadam roadway was constructed along the west side of sections 1 and 2 of Potomac Park, extending from the inlet of the tidal reservoir to the foot of Twenty-sixth street NW., and the ground on either side of it graded, soiled, seeded, sod borders laid; gutters, catch basins, cinder bridle path, and footwalk constructed, the work being done from the $80,000 appropriated by Congress in sundry civil act approved March 4, 1907. The part of this improvement between the inlet of the reservoir and the outlet of the drainage canal was done in April, May, and June, 1907, as stated in last annual report. The part of the roadway between

the drainage canal outlet and the foot of Twenty-sixth street NW. was done between July 1, 1907, and June 30, 1908. The ground between the Easbys Point sewer at the foot of Twenty-third street and Twenty-sixth and Water streets required a very heavy fill, and as this filling would not have settled sufficiently to permit of the completion of the improvement by June 30, 1908, Congress reappropriated the unexpended balance of the appropriation, which amounted to $21,000, and made it available for completing the roadway and for general improvements during the fiscal year 1909.

Work was also done for completing the improvement of the part of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the Virginia channel of the Potomac River, and the tidal reservoir, due to change in street car tracks and the erection of bridge across the outlet of the tidal reservoir to the Washington channel.

An improvement was also made in the southeast corner of the Monument Grounds Annex (Potomac Park) by changing the direction of the river drive between Fourteenth street and the Fifteenth street roadway for a length of about 800 feet, so as to bring it out into Fourteenth street opposite Water street SW.

Park curbing.—Substantial and gratifying progress has been made during the year in constructing cement copings around reservations, with corner posts of similar materials at entrances to walks. A total length of 2,072 feet of coping and 11 corner posts were built during the year, the work having been done under contract. The reservations thus inclosed are enumerated in the following table:

Table showing the extent of artificial stone coping constructed as borders around United States public reservations during the fiscal year ending June 30, 1908.

Reservation.	Length.	Number of corner posts.
	Feet.	
Res. 34, Pennsylvania avenue, Ninth and C streets NW	395	.....
Res. 35, Pennsylvania avenue, between Eighth and Ninth streets NW	300	8
Res. 58, Massachusetts avenue, Twenty-first and Q streets NW	295	.....
Res. 116, Virginia avenue, Sixth and D streets SW	186	.....
Res. 172, New York avenue, Thirteenth and H streets NW	357	.....
Res. 187, Louisiana avenue, Sixth and D streets NW	360	.....
Res. 203, Maryland avenue, First and A streets NE	179	3
Total	2,072	11

PARK WATCHMEN.

I again desire to invite special attention to the force of park watchmen, which force is improperly named and insufficiently paid. The designation of "watchmen" does not describe the members of this force and their duties. They are strictly policemen, with all the powers of the regular police force, and their duty is to maintain proper police control over the parks.

The compensation of the watchmen is also not commensurate with the duties they perform, and it is earnestly recommended that the following schedule of pay be adopted for the force:

First sergeant in charge, per annum	$1,100
Second sergeant, per annum	1,050
Privates of class 1, per annum each	780
Privates of class 2, per annum each	900
Privates of class 3, per annum each	1,000

I am actuated in asking this increase by the fact that Congress, by act approved June 8, 1906, increased the compensation of the Metropolitan police force of this city. The act referred to increased the pay of sergeants from $1,140 to $1,250 per annum, placed the pay of privates of class 1 at $900 per annum and privates of class 2 at $1,080 per annum, and created an additional class, class 3, with compensation of $1,200 per annum. Privates of the first class consist of those who have served less than three years. Privates of the second class consist of those who have served over three years and less than five years, and privates of the third class are those who have served over five years. In preparing the foregoing new schedule for the park police I have copied the Metropolitan system, except that the rates are considerably less for the park police force.

One of the arguments used in urging an increase of pay for the Metropolitan police was the increased cost of living during the past three or four years, and that argument will apply to the park police as well as to the Metropolitan force.

While it may be held that in many cases the duties of the park police are not as onerous as those of the men doing duty on the streets and for that reason they are not entitled to the same rates of pay, yet it can not be denied that the present pay of the park force is inadequate and should be increased for the reasons stated here, and also at length in the annual reports of this office for some years past.

I consider the question of adequate compensation for this body of faithful public servants of much importance, and it is hoped that Congress will give my recommendation favorable consideration.

The designation of the members of the force should also be changed from that of "park watchman" to "park policeman." Park watchmen were, by act of Congress approved August 5, 1882 (22 Stats., p. 243), given the same powers and duties as the members of the Metropolitan police force of this city, and the designation "policeman" better describes the duties performed by them. Moreover, it conveys to the public a more convincing idea of authority.

The acts of Congress providing for park watchmen have designated the parks in which each shall perform duty. It is considered that it would be an improvement were the necessary watchmen provided, without assigning them to particular parks. Under such an arrangement the members of the force could be assigned from time to time by the officer in charge to the parks where their services might be most needed.

It is also recommended that necessary legislation be adopted providing that all fines and forfeitures of collateral from cases brought before the police court by United States park police shall be held and reserved for the benefit of the United States park police under rules similar to those now in force for the Metropolitan police of the city.

The table on the following page shows that in the parks for which watchmen are provided there were 277 arrests made during the year, and that the fines imposed and collateral forfeited in those cases amounted to $1,867; that in addition to the arrests made 2,647 drunken people and 1,399 persons of objectionable character were ejected from the parks.

	1907.						1908.						
	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Total.
Nature of offense.													
Disorderly	19	14	12	7	9	5	.....	4	3	11	20	7	111
Drunkenness	.....	3	2	4	1	5	1	3	2	1	5	2	29
Trespassing	.....	.....	2	3	1	1	1	8	.....	3	4	6	29
Vagrancy	4	3	1	7	1	3	1	3	.....	7	3	6	39
Indecent exposure	1	1	1	3	1	2	.....	3	1	3	5	2	23
Violating park regulations	.....	.....	.....	.....	.....	.....	.....	1	1	.....	.....	.....	2
Fast driving of horses	.....	.....	.....	1	.....	.....	.....	.....	.....	1	.....	.....	2
Fast driving of automobiles	1	.....	.....	.....	.....	.....	.....	1	.....	.....	1	1	4
Assault	.....	2	.....	1	.....	.....	.....	.....	.....	.....	1	2	6
Assaults on officers	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	2
Robberies	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Disorderly assemblies	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	.....	6
Violating hack regulations	1	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	4
Throwing missiles	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	3
Violating police regulations	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
Collisions	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Indecent assault	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Larceny	2	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	4
Delivering short weight of ice	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Insane	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2
Destroying public property	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	3
Suspicious characters	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Profanity	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Total number of arrests	29	32	22	26	14	16	4	23	7	26	48	30	277
Drunkards ejected	283	348	288	321	133	147	104	128	133	248	267	247	2,647
Objectionable characters ejected	142	160	120	136	86	41	26	30	51	171	152	284	1,399
Disposition of cases.													
Fined	11	8	9	4	4	2	.....	4	2	9	18	8	79
Forfeited collateral	15	12	6	7	5	4	1	11	3	6	15	6	91
Personal bonds taken	.....	1	2	.....	.....	1	.....	1	.....	4	.....	2	11
Sent to workhouse	1	6	1	7	4	4	1	3	.....	4	7	8	46
Drunkards released	.....	3	2	4	1	5	1	3	2	1	5	2	29
Cases nolle prossed	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	1
Dismissed	.....	.....	1	1	.....	.....	.....	1	.....	2	2	1	8
Turned over to Metropolitan police	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	2
Sent to reform school	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Insane	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Turned over to parents for correction	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	2
Sent to penitentiary	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Continued	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
On probation	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Lost children sent home	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	3
Total cases disposed of	29	32	22	26	14	16	4	23	7	26	48	30	277
Record of fines.													
Total amount of fines	$120	$36	$46	$75	$25	$45	.....	$35	$10	$130	$192	$65	$779
Total amount of collateral forfeited	158	88	47	190	58	48	$5	41	20	265	128	40	1,088
Total fines and collateral forfeited	278	124	93	265	83	93	5	76	30	395	320	105	1,867
Fatal accidents	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	1
Sick and injured sent home or to hospital	2	7	1	5	1	1	1	4	2	.....	3	3	30
Attempted suicide	.....	.....	.....	.....	.....	.....	.....	1	.....	1	.....	.....	2
Suicide	.....	.....	.....	1	.....	1	.....	.....	.....	1	1	1	5
Died in parks	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	2

CHILDREN'S PLAYGROUNDS.

Special attention was invited to this subject in my annual report for 1904, page 3922, Report of the Chief of Engineers for 1904, and the recommendations therein made are repeated, namely: That an appropriation of $3,000 be made for establishing, maintaining,

and caring for children's playgrounds on public reservations in Washington.

MAINTENANCE OF IMPROVED PARKS.

The usual work required for maintaining the improved parks and park spaces in good condition was extended during the year. This work consisted of mowing and raking lawns, edging their borders, sodding or seeding bare places on them, planting and caring for flower beds, pruning trees and shrubs, trimming hedges and removing dead trees, cleaning gutters and draintraps, and sweeping paved roads and walks. In the autumn of 1907 some of the flower beds were planted with pansy plants and some with flowering bulbs for early spring bloom. In these plantings 20,000 pansies and 30,500 bulbs were used. In the spring of 1908 the beds and vases were planted with 801,360 bedding and tropical plants for summer decoration. These beds were protected in most cases by hooped irons placed around them.

The special efforts made by this office during the fiscal years 1904, 1905, 1906, and 1907 to remove the blemishes caused by bare places on the lawns and worn borders by resodding have been continued, and during the year ending June 30, 1908, 8,765 square yards of sod were used in sodding those places, vastly improving the appearance of the parks and park places thus treated.

In addition to the foregoing the following special work was accomplished:

NORTHWEST DIVISION.

Du Pont Circle.—Repairs were made to worn places in the asphalt walks, the area resurfaced amounting to 64.4 square yards. The old paint was burned off of the exterior of the watchman's lodge, and the surface repainted with four coats of paint. The roof was painted with one coat. The hooped irons inclosing the mound on which the statute of Admiral Du Pont stands were reset, wired, and painted.

Farragut Park.—The asphalt walks were repaired over an area of 21.7 square yards.

Franklin Park.—Portions of the old paint were burned off of the exterior of the watchman's lodge, those places painted with four coats, the remainder with two coats and the roof with one coat. A rough box of planks was placed in a shady place on the east side and filled with sand for small children to play in.

Judiciary Park.—Worn places in the gravel roads and walks were repaired with fresh gravel, and low places in the lawns were raised with soil and grass seed sown. The old wooden flooring and floor beams in the lodge house were taken up and replaced with new material, new drainpipe was placed in toilet room in place of old pipe, repairs were made to the water-closets and a gas-light fixture was placed in the women's toilet room. The woodwork in women's toilet room was painted. Broken glass was replaced with new glass. Seventy-two feet of 6-inch terra-cotta drainpipe were laid for draining one of the roadway traps. Seventy-one square yards of old asphalt foot walk and 125 square yards of old asphalt roadway were repaired.

Lafayette Park.—Repairs were made to worn places in the gravel walks.

Mount Vernon Park.—The post and wire fences around the park were repaired and hooped iron guards were placed around the four corners of the park to prevent trespasses on the lawns.

President's Park.—Forty-five cartloads of gravel were used in repairing worn places in gravel roadways. A wash basin was placed in the lodge house at Fifteenth and B streets NW., and water-supply pipe and drainpipe run for its service. The work of surfacing the main gravel roadway around the Ellipse with broken trap rock, which was commenced in previous years, was completed. This year the southern part of the roadway was covered with the stone, and the E street gravel roadway in the northeast corner of the park was also surfaced with the broken trap rock. Square stone blocks were set along the edge of the north side of this latter roadway to prevent vehicles from driving into the gutters. The area of roadway covered with the broken stone was about 11,073 square yards, requiring approximately 1,460 tons of trap rock and 208 tons of crushed limestone for cementing. Repairs were made to the cement walks and coping at the Sherman statue, in the northeast corner of the park. All uneven flagstones in the sidewalk on the south and west sides of the Treasury Department building were taken up and reset. The asphalt roadway pavement in West Executive avenue between the White House and Navy Department was repaired over an area of 15 square yards. On Easter Monday, April 30, 1908, a concert was given by the Marine Band in the afternoon for the benefit of the children, in accordance with usual custom. The platform, chairs, and music racks for the bandsmen and park settees for spectators were placed on the north side of the Ellipse. These preparations for the concert and the cost of labor employed in cleaning up the grounds after the concert amounted to about $19.

Rawlins Park.—Low places on one of the foot walks were filled up with gravel.

Scott Circle (reservation 63), Massachusetts avenue, Sixteenth and N streets NW.; reservation No. 62, Massachusetts avenue and N, between Sixteenth and Seventeenth streets NW.; reservation No. 64, Massachusetts avenue and N, between Fifteenth and Sixteenth streets NW.—New water service was run for each of these reservations, 126 feet of 1-inch lead pipe for Scott Circle, 146 feet of 1-inch lead pipe for reservation 62, and 132 feet of 1-inch lead pipe for reservation 64. These reservations were formerly supplied from an old 6-inch main running under the Scott statue, but as breaks had happened in this main, and as it was feared that should others occur the foundation of the statue might be endangered, the Commissioners of the District of Columbia were asked to abandon the old main and run new mains under the roadways outside the circle, and this was done. The hooped irons around the statue of Webster in reservation 62 were reset, wired, and painted, and some new post and wire fencing was erected to prevent trespassing.

Washington circle.—Twenty-five cartloads of gravel were used in resurfacing the walks.

Center parking on Indiana avenue, between Second and Third streets NW.—This parking was overhauled and a large portion of it graded anew. Ditches along both sides of the car tracks were filled with soil and a line of sod laid. Sod on other portions which required grading was lifted and relaid after the grading was finished.

Reservation 22 (Pennsylvania avenue, Twenty-eighth and M streets NW.).—The greater portion of the surface of this reservation was loosened up and resodded, 221 square yards of sod having been used for the purpose.

Reservation 30 (Pennsylvania avenue, Nineteenth and H streets NW.).—Repairs were made to worn places in the asphalt walks, the area resurfaced amounting to 20 square yards.

Reservation 33 (Pennsylvania avenue, Thirteenth and E streets NW.).—The surface of the ground over the roof of the new underground public comfort station constructed in this reservation by the District government was graded, soiled, and sodded, and bare places on the lawns were resodded, the entire work requiring 645 square yards of sod. The sewer vent and coal hole connected with the station were raised to the new grade, and the asphalt walk, which was destroyed when the station was constructed, was relaid over a surface of 172.7 square yards. Part of the cost of this work was borne by the District government. A wooden post and wire fence was placed on both sides of the walk to prevent trespassing on the lawns.

Reservation 34 (Pennsylvania avenue, Ninth and C streets NW.).—The raising of the grade of Pennsylvania avenue at Ninth street by the District government left this reservation about 18 inches below grade on its northern side. The iron post and bar fence was therefore taken down and removed to storage, the old cement pavements through the reservation taken up, the large iron fountain taken down, a new foundation and basin constructed for it, the fountain reerected, and water supply and drainpipe run for it. The reservation was brought to proper grade, grass seed sown, a border of sod laid on the outer edges, and a cement coping constructed around it, 395 feet in length.

Reservation 35 (Pennsylvania and Louisiana avenues, between Eighth and Ninth streets NW.).—The iron post and bar fence inclosing this reservation was taken down and replaced with a cement coping 300 feet in length, with 8 corner posts of same materials, 2 at each of the four entrances to the walks. This work required the regrading and resodding of a large part of the reservation. New asphalt pavement was laid at the entrances to walks, necessitated by the raising of the entrances to conform to the new grade of the surrounding sidewalks established by the District government. The area of walk constructed was 42.2 square yards.

Reservation 57C (Twenty-second street, between Decatur and S streets NW.).—The parking on the east side of this reservation was regraded and sodded, requiring 162 square yards of sod.

Reservation 57D (Florida avenue and Twenty-second street, between Q and R streets NW.).—This unimproved reservation, which was transferred to the jurisdiction of the Chief of Engineers by the District Commissioners on November 16, 1906, was partially improved. Its asphalt and concrete surface, being the old street pavement of which the reservation was once a part, was picked up and hauled away, the reservation graded with clay, top soil spread, and the surface sodded, requiring 71 square yards of sod.

Reservation 58 (Massachusetts avenue, Twenty-first and Q streets NW.).—The post and chain fence inclosing this reservation was taken down and replaced with a cement coping 295 feet in length, and the necessary regrading and resodding done.

Reservation 59 (*Massachusetts avenue, Twentieth and P streets NW.*).—The sod was removed from the ground around the fountain basin for a distance of 15 feet out from the same, the soil removed and temporarily piled, the grade raised to the lower side of the basin rim, the soil respread and the sod relaid.

Reservation 65A (*Highland terrace, Massachusetts avenue, between Fourteenth and Fifteenth streets NW.*).—Eight panels of the iron fence adjoining the driveway on the north side of the terrace, that had been thrown out of place by carriages, were reset and repaired.

Reservation 68 (*Massachusetts avenue and L street, between Eleventh and Twelfth streets NW.*).—The asphalt walks were repaired, the area resurfaced amounting to 69.2 square yards.

Reservation 69 (*Massachuseets avenue and L street, between Tenth and Eleventh streets NW.*).—Repairs were made to worn places in the asphalt walks over an area of 106.2 square yards.

Reservation 74 (*Massachusetts avenue and I street, between Fourth and Fifth streets NW.*).—The asphalt walks in this reservation being much worn, they were resurfaced with asphalt topping, the area covered amounting to 153 square yards.

Reservation 99 (*Virginia avenue, Twenty-fourth and G streets NW.*).—Bare places were loosened up and resodded over an area of 85 square yards.

Reservation 138 (*New Hampshire avenue, Twenty-second and L streets NW.*).—The post and wire fence was repaired.

Reservation 140 (*New Hampshire avenue, Twenty-first and M streets NW.*).—The post and wire fences for preventing trespassing on the lawns were repaired.

Reservation 144 (*New Hampshire avenue, Seventeenth and S streets NW.*).—Worn places in the asphalt walks were repaired over an area of 20 square yards.

Reservation 148 (*New Hampshire avenue and Fifteenth street, between V and W streets NW.*).—An iron post and chain fence was erected around this reservation in March, 1908, requiring 23 posts and 200 feet of chain.

Reservation 163 (*Vermont avenue, Thirteenth and O streets NW.*).—The old 2-inch water service was removed from this reservation and replaced with 34 feet of 1-inch lead pipe and 45 feet of 1¼-inch galvanized iron pipe.

Reservation 172 (*New York avenue and H street, between Thirteenth and Fourteenth streets NW.*).—The post and chain fence inclosing this reservation was taken down and in its place a cement coping 357 feet in length was constructed. The ground back of the coping was regraded, a sod border laid, and the remainder of the ground seeded and rolled.

Reservation 173 (*New York avenue and I street, between Eleventh and Twelfth streets NW.*).—Broken chain in the iron post and chain fence inclosing the reservation was repaired. Repairs were made to the asphalt walks, the area resurfaced amounting to 45.8 square yards.

Reservation 174 (*New York avenue and I street, between Tenth and Eleventh streets NW.*).—Worn places in the asphalt walks were repaired over an area of 55.1 square yards.

Reservation 177 (New York avenue and L street, between Fifth and Sixth streets NW.).—Fifty hooped irons were set at the corners of this reservation to prevent travel over the lawn surface.

Reservation 180 (New York avenue, Third and M streets NW.).—This unimproved reservation was improved. The macadam roadway surface, of which the reservation was once a part, was excavated and the material hauled away for use elsewhere; the ground was then graded with clay received without expense to the United States, top soil spread, the entire surface, 278 square yards, sodded, and water introduced, 56 feet of 1-inch lead pipe and 6 feet of 1¼-inch galvanized iron pipe having been laid for the purpose.

Reservation 187 (Louisiana avenue, Sixth and D streets NW.).—The post and chain fence inclosing this reservation was taken down and replaced with a cement coping 362 feet in length. Nearly the entire surface of the reservation was regraded, top soil spread, the flower bed remade, a sod border laid, and the remainder of the ground sown with grass seed.

Reservation 270 (Connecticut and Florida avenues and S street NW.).—The hooped irons used as a fence were reset and painted.

Reservation 303AB and 303C (Connecticut avenue, between Kalorama road and Connecticut Avenue Bridge).—These two park spaces were transferred by the Commissioners of the District of Columbia to the Chief of Engineers on April 27, 1908. They are located in the center of Connecticut avenue, at the south entrance to the new bridge carrying that thoroughfare over Rock Creek. They contain a total approximate area of 13,500 square feet. Work for their partial improvement was at once commenced and completed in May. Their surfaces were brought to grade with clay hauled in without expense to the United States, top soil spread, a border of sod laid around each, the remaining surface sown with grass seed, a flower bed laid out in each, and water introduced, 215 feet of 1½-inch galvanized-iron pipe having been laid for the purpose.

Reservation 305 A (Columbia road, Kalorama road, and Nineteenth street NW.)—This unimproved reservation was improved. The ground was loosened up and brought to proper grade by the removal of 116 cubic yards of clay, good soil was spread over its surface, a border of sod laid, grass seed sown over the remaining area, and water introduced by laying 10 feet of 1-inch lead pipe and 6½ feet of 1¼-inch galvanized-iron pipe.

SOUTHWEST DIVISION.

Henry Park.—Fourteen cubic yards of gravel were used in repairing gravel roads, 160 linear feet of new board walk were laid in place of old walk that had become unserviceable, and 72 square yards of flagstone pavement were taken up and relaid. Work was commenced in April, 1908, for filling up the abandoned freight-car yard of the United States Fish Commission at the southeast corner of the park, in order to bring it to the grade of the park. This work will be done as fast as the grading material, which is being hauled in without expense, can be procured. Up to June 30, 1908, 493 cubic yards of clay had been so received and used for the purpose. Repairs were made to the asphalt walks, the area resurfaced amounting to

286.4 square yards. The road east and south of the Fish Commission building was graded with 43 cubic yards of gravel, and the surface spread over an area of 600 square yards, with 57 tons of 1-inch trap rock and 24½ tons of crushed limestone.

Monument grounds and annex.—Two board walks, one 488 feet long leading from the Monument to the boiler house and one 192 feet long leading to the Monument, were constructed in place of the old walks that had become unserviceable. Also 262 square yards of old board walks in other parts of the grounds were taken up and relaid with new material.

Twelve cubic yards of gravel and 13 cartloads of limestone were used in repairing gravel roads. A trench was opened on the east side of the Monument lodge house and 198 feet of 6-inch terra-cotta pipe laid to drain the roadway, and 70 feet of 4-inch drain tile were laid south of the lodge for draining the parking and walks. The ground disturbed by a contractor for the District government in laying a storm-water conduit through a portion of these grounds last year was restored by replacing 96 square yards of cobblestone gutter and 14 square yards of trap-rock gutter, repairing roads crossed by the conduit, laying 100 square yards of sod border, and grading and sowing with grass seed the lawn surface over the entire length of the trench. This work was paid for by the District.

The water service near the sea wall was extended by laying 330 feet of 1¼-inch galvanized-iron pipe, with connections for two hose valves. The water was emptied from the large pond on the south side of B street, between the entrances to the Sixteenth street and Seventeenth street roadways, and clay, etc., is now being received there, without cost to the United States, for gradually filling the pond. Fifty-eight square yards of cobble-stone gutter and 216 square yards of trap-rock gutters were repaired. The tar which was placed on the surface of a portion of the main driveway on the west side of the grounds, adjoining the Tidal Reservoir, was removed and the surface repaired with 68 cartloads of trap-rock screenings over an area of 1,910 square yards. The surface of the Seventeenth street roadway was treated with an emulsion of oil over an area of 3,525 square yards, starting at Seventeenth and B streets NW.

The south end of the river drive in Monument Park Annex (Potomac Park) was changed in direction for a length of about 800 feet, required by the changes made in the grade of Fourteenth street at Maryland avenue SW. and the proposed opening up of Water street at that point by the District Government. The old roadway which formerly terminated in a circle near the reservoir outlet gates was torn up, the gutters, walks, bridle path, and water main removed, and the space left thereby turned into lawn surface. The new roadway was then built and was so constructed that it opens out into Fourteenth street opposite the proposed entrance to Water street. The materials from the old roadway were used as far as required in constructing the new roadway. The following table shows the work done in making the change above mentioned:

Area of driveway constructed	square yards	2,300
Area of cinder walk consrtucted	do	440
Area of cinder bridle path constructed	do	925
Area of brick gutter (2½ feet wide) constructed	do	347
Area graded and seeded	do	12,200
Area sodded	do	200

Quantity of clay handled	cubic yards	10,000
Quantity of soil handled	do	2,000
Quantity of cinders handled	do	250
6-inch cast-iron water pipe laid	feet	184
3-inch cast-iron water pipe laid	do	108
1¼-inch galvanized-iron water pipe laid	do	765
8-inch terra-cotta drain pipe laid	do	25
6-inch terra-cotta drain pipe laid	do	49
Brick catch basins built		3

A new wooden floor was placed over the top of the outlet gates of the Tidal Reservoir.

On December 5, 1907, the Commissioners of the District of Columbia transferred to this Office the boathouse near the landing basin, at the foot of the Seventeenth street driveway, opposite the old bathing beach, and on January 11, 1908, the Chief of Engineers leased the house to the man who had been occupying it since March, 1902, under lease from the District government, the said lessor to pay a rental of $50 per annum, and to keep the building in repair, and to make certain improvements thereon, all at his own expense. The lease also provided that he should rent boats and bathing suits, and care for small boats and launches owned by private parties, sell bait, etc., under terms and conditions stated in the lease, and all under the supervision of this Office. The boathouse was connected with the new 6-inch water main running near it.

Seaton Park.—New galvanized-iron gutter and spouting were placed on the lodge house, 32 cubic yards of gravel used in repairing gravel roads, 324 square yards of flagstone walk taken up and relaid, and 8 cartloads of limestone screenings were used in repairing low places in the gravel walks.

Smithsonian grounds.—Twelve squirrel boxes were made and placed in the trees, gravel walks were repaired with 8 cubic yards of gravel, and 57 cartloads of crushed limestone were used in repairing worn places on the gravel walks and in making crossings over the gravel roads; 36 cubic yards of gravel were used in repairing gravel roads; 16 Norway maples were planted along walks on Seventh street side of the park; 122 square yards of board walk were laid; 27 feet of 4-inch cast-iron drainpipe were laid, 1 cesspool trap placed, and 1 cement catch-basin built for carrying off surface drainage from roads and gutters; 3 wooden bridges were constructed over gutters on the line of bridle path; 566 square yards of brick gutter and 168 square yards of cobblestone gutter were taken up and relaid, and 115 linear feet of brick gutter were repaired. The exterior of the small tool house on the Twelfth street side was painted, and a cast-iron drainpipe was run to the down spout on the lodge house on Seventh street side. Repairs were made to the asphalt footwalks over an area of 169.2 square yards, 154 square yards of new asphalt footwalks were constructed, and the old worn surface of the main asphalt roadway running through the grounds from Seventh to Twelfth streets was removed, and a new asphalt surface laid over an area of 4,830.7 square yards.

Reservation 116 (*Virginia avenue, Sixth and D streets SW.*).—On November 22, 1907, the Chief of Engineers granted permission to the Commissioners of the District of Columbia to encroach 3 feet on the Virginia avenue side and 18 inches on the Sixth street side of this

reservation for the purpose of widening the public sidewalks at that location, under the provision contained in section 4 of the act of Congress, approved July 1, 1898 (30 Stat. L., 570). The iron post and bar fence on those two sides of the reservation were accordingly taken down by this Office. When the new sidewalks were completed by the District government, the surface of the reservation was graded down to conform to the new grades of Sixth street, which had been lowered by the Commissioners in connection with the work in progress by the Pennsylvania Railroad for the elimination of grade crossings. The 18 iron posts of the fence that had been left on the south side of the reservation were straightened, 138 feet of new 1¼-inch iron-pipe rail run through them, and brick on edge laid along the line of same; a sod border was laid, the ground seeded and rolled, and a cement coping 186 feet in length constructed along the west (Sixth street) side and the north (Virginia avenue) side of the reservation. The cost of grading down, sodding, and seeding this reservation was refunded to this Office by the District government.

West Potomac Park, between Potomac River, Tidal Reservoir, and Drainage Canal.—Twelve park settees were placed along footwalks, 171 trees were planted along the borders of roadway and in lawn surface, and about 10,000 square yards of the macadam roadway along the river side was treated with oil.

Completing improvement of East Potomac Park.—The work of completing the improvement of that part of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the Virginia channel of the Potomac River, and the Tidal Reservoir, due to changes in the car tracks of the Alexandria and Mount Vernon Electric Railway and the erection of bridge across the outlet of the Tidal Reservoir into the Washington channel of the Potomac River, was in progress during the year, and was completed in June, 1908. It consisted in completing the macadam roadway extending along the foot of the causeway from the south end of the river road to meet the paved wagon-road approach to the highway bridge, in constructing gutters along the sides of the roadway, building brick drain traps, laying drainpipe and water pipe, grading ground for lawn surfaces near the west end of the new concrete bridge across the outlet from the Tidal Reservoir to the Washington channel, and grading the large elliptical field in the center of the park. This field, which contains 14 acres, was, when completed in the fiscal year 1906, left about three feet below the grade of other lawn surfaces, as the cost of filling it with material brought in by carts and wagons would have been too great to have warranted the work being done even if money had been available, which it was not. An opportunity was soon presented, however, for having this field filled up by the officer in charge of the Potomac River improvement, who desired a place where he could deposit material dredged from the Tidal Reservoir under his contract with a dredging company, and the field was accordingly filled up in this way between November 1, 1907, and January 1, 1908. The filling had settled and dried out sufficiently by March to permit of grading to be undertaken, and the retaining banks were leveled, the surface of the field plowed, harrowed, and graded, and by June 30 had been prepared for seeding down.

The following table shows the amount of work done in making the improvement above mentioned:

Area of driveway constructed	square yards	2,120
Area of driveway reconstructed	do	1,075
Area of cinder walk constructed	do	300
Area of bridle path constructed	do	2,410
Area of brick gutters (2 feet wide) constructed	do	435
Area graded	do	89,000
Area sodded	do	1,600
Quantity of clay handled	cubic yards	15,000
Quantity of soil handled	do	8,000
Quantity of cinders handled	do	400
2-inch galvanized-iron water pipe laid	feet	1,407
1½-inch galvanized water pipe laid	do	681
10-inch terra-cotta drainpipe laid	do	620
8-inch terra-cotta drainpipe laid	do	80
6-inch terra-cotta drainpipe laid	do	262
Brick catch-basins built		6

The improved portions of these grounds were maintained in good condition, the stock in the nursery pruned and cared for, and the roads and walks therein kept in good repair.

Macadam roadway along west (river) side of sections 1 and 2 of Potomac Park.—This roadway was constructed and the ground on either side thereof improved by grading, soiling, seeding, and sodding, constructing cinder walks and bridle paths, brick gutters and draintraps, laying drainpipe and water pipe, and planting trees, with the $80,000 appropriated by Congress in sundry civil act approved March 4, 1907. The roadway extends from the inlet of the Tidal Reservoir to the foot of Twenty-sixth street NW. It is 6,350 feet in length and 44 feet wide. The section extending from the inlet to the drainage canal, which section is 2,550 feet in length, was, as stated in last annual report, constructed between March and June, 1907, with the $15,000 of the appropriation which Congress made immediately available. The remaining section between the canal and the foot of Twenty-sixth street was constructed between July 1, 1907, and June 30, 1908. The two sections are connected by a bridge built across the mouth of the canal on pile bents, with timber deck. The bridge is 156 feet long and 20 feet wide, and was constructed under contract. It will be removed as soon as the drainage canal is filled up and the filled-in material is solid enough to build the roadway across it. The canal is now being filled with material dredged from the river by the engineer officer in charge of the Potomac River improvement, and in March and April about 4,830 cubic yards of clay were hauled in without expense to the United States and used in filling up at the mouth of this canal where the roadway is to cross. The sea wall on the river side of the new roadway was raised 4 feet for a length of 110 feet at a point about 1,600 feet north of this bridge to retain the footing of an earthen embankment built at that point and on which a circle is laid out in the center of the roadway. Eight park settees were placed on the completed cinder walk near the sea wall on the river side, and 20 seats were placed at intervals along the finished roadway. The site of the north end of this roadway, being the stretch between the mouth of Easbys Point sewer, at foot of Twenty-third street, and the terminus at Twenty-sixth and Water streets, was a gully much below the grade of the other portions. This was filled up to grade with 25,000 cubic yards of clay, ashes, etc., hauled in and

spread without expense to the United States between August, 1907, and March, 1908, and with 2,640 wagon loads of clay filling purchased by this office at a low price. As this filling would not have settled sufficiently to permit of the completion of the improvement by June 30, 1908, Congress reappropriated (in sundry civil act approved May 27, 1908) the unexpended balance of the appropriation, which amounted to $21,000, and made it available for completing the roadway and for general improvements during the fiscal year 1909.

The following table shows the amount of work accomplished in making the improvements above mentioned:

Area of driveway constructed	square yards	17,000
Area of cinder walk constructed	do	3,730
Area of bridle path constructed	do	6,080
Area of brick gutters (2 feet wide) constructed	do	1,640
Area graded	do	143,220
Area sodded	do	4,608
Quantity of clay handled	cubic yards	27,200
Quantity of soil handled	do	20,000
Quantity of cinders handled	do	1,630
6-inch cast-iron water pipe laid	feet	2,470
2-inch galvanized-iron water pipe laid	do	743
1¼-inch galvanized-iron water pipe laid	do	1,210
6-inch terra-cotta drainpipe laid	do	1,190
Brick catch basins built		34
Masonry wall constructed	cubic yards	35
Bridge across mouth of drainage canal		1

There are submitted with this report to illustrate this improvement a scale drawing of Potomac Park showing this River Side drive from the inlet to Twenty-sixth street; also four photographs, as follows: View of River Side drive looking south toward the inlet and the highway bridge; view of the drive looking north toward Georgetown; view of the circle on River Side drive, and view of old drainage canal from outlet and River Side drive.

Park roadway along B street north.—In sundry civil appropriation act for the fiscal year ending June 30, 1909, approved May 27, 1908, Congress appropriated the sum of $70,000 for continuing the improvement of Potomac Park by continuing north B street from Virginia avenue westward to the Potomac River as a park roadway along the northern boundary of Potomac Park, according to plans prepared in this office, including the acquisition by purchase or condemnation of squares 63 and 89, to be expended under the direction of the officer in charge of this office.

Correspondence was at once entered into with the owners, or those representing the owners, of lots in those squares, with a view to getting offers from them for the sale of the land. The services of a number of gentlemen experienced in appraising real estate were secured to appraise the value of the land, in order that this office might have expressions of opinion from unbiased sources to compare with the offers made by the owners.

The site of this proposed B street roadway through the United States land west of Twenty-third street is very low, and work was commenced in May building an embankment for the roadway with ashes and clay, which were hauled in and spread without expense to the United States. During May and June, 1908, there were received and used in this way about 5,351 cubic yards of those materials.

VIEW OF RIVERSIDE DRIVE, LOOKING SOUTHEAST TO THE INLET.

VIEW OF RIVERSIDE DRIVE, LOOKING NORTHWEST TO NORTH B STREET.

VIEW OF RIVERSIDE DRIVE CIRCLE, LOOKING SOUTHEAST.

VIEW OF OLD SEWER CANAL, LOOKING EAST FROM RIVERSIDE DRIVE TEMPORARY BRIDGE.

VIEW OF RIVERSIDE DRIVE, LOOKING SOUTHEAST TO THE INLET.

VIEW OF RIVERSIDE DRIVE, LOOKING SOUTHEAST TO THE INLET.

VIEW OF RIVERSIDE DRIVE, LOOKING NORTHWEST TO NORTH B STREET.

VIEW OF RIVERSIDE DRIVE CIRCLE, LOOKING SOUTHEAST.

EAST DIVISION.

Center parking on Pennsylvania avenue between Second and Sixteenth streets SE.—The Capital Traction Company, in laying new tracks through the center of this parking, destroyed portions of the grassed surfaces. These were restored by workmen employed by this office and the cost thereof refunded by the railroad company.

Folger Park.—Bare places on the lawns were loosened up, seeded, and rolled; 144 cartloads of gravel were used in repairing the graveled margins of asphalt walks.

Garfield Park.—As stated in last annual report, the opening of Second street through this park by the District Commissioners rendered the old gravel roadways through the park no longer necessary, and the materials of which they were composed were excavated and removed, the areas filled with clay, soiled and sodded, and turned into lawn surface. The walks that were to be abandoned were also treated in the same manner, and those that remained were continued out to the sidewalk pavements. The banks left by the cutting through of Second street were regraded, surface soiled, and sodded. The banks left on the south side by the lowering of Virginia avenue, in connection with the elimination of grade crossings, were also graded. Fifty feet of 4-inch cast-iron drainpipe were laid to drain the catch-basin of a water hydrant placed on the east side of the park for the use of the children, that section of the grounds having been set aside as a playground. Two new cinder footwalks were constructed and the old gravel walks repaired, 24 cartloads of gravel having been used in the work. All wire fencing was repaired and painted, and the exterior of the building in the northeast corner, used as a tool house and workshop, was painted with two coats of paint. A new walk was constructed at Second street and Virginia avenue and surfaced with screened gravel.

Lincoln Park.—A new asphalt walk covering an area of 33.1 square yards was constructed and repairs made to 50 square yards of old asphalt walk surface. The graveled margins of asphalt walks were repaired with 79 loads of screened gravel. One of the iron display fountains came apart and fell down. The parts were taken to the shops, repaired, and the fountain reerected and painted. A large and spreading plane tree on the mound northeast of lodge house died and was removed. The lawns damaged in removing it were repaired with good soil and seeded. Dead and unsightly limbs were removed from 140 trees.

Marion Park.—The driveway through the park was regraveled with 14 cartloads of gravel and rolled, and the gravel margins of the asphalt walks were resurfaced with 65 cartloads of screened gravel. Repairs were made to the wire fencing put up to prevent trespassing.

Stanton Park.—Two new asphalt walks were constructed, covering an area of 261 square yards, 160 square yards of old asphalt walks were repaired, and 126 cartloads of screened gravel used in repairing margins of asphalt walks. One drinking fountain was erected, pipes run for same, and a cement block platform built around its basin. All bare places on lawns were loosened and seeded down. Dead and unsightly limbs were removed from 34 trees. The carved letters on the pedestal of the General Greene statue were repainted.

Reservation 19 (between K and L and Fifth and Six-and-a-half streets SE.).—This reservation, which is unimproved, and has been used as a storage ground for gravel, street-paving material, etc., was cleaned up, the weeds cut, and stone and rubbish removed. The reservation has been assigned as a children's playground.

Reservation 45 (South Carolina avenue and D street, between Seventh and Eighth streets SE.).—A number of unsightly trees, and others that were located where the ground was too densely shaded, were removed and the holes filled with clay, soil spread, and grass seed sown.

Reservation 53 (Pennsylvania avenue and G street, between Thirteenth and Fourteenth streets SE.).—Under date of August 17, 1907, the Chief of Engineers granted the owner of the private land adjoining this reservation permission to fence in and care for the reservation at his own expense, under the authority granted by section 2 of the act of Congress approved July 1, 1898 (30 Stats., p. 570).

Reservation 56 (Pennsylvania avenue and Seventeenth street East).—Eleven iron parking posts were aligned around this unimproved reservation in order to define the boundary lines of the United States property.

Reservation 86 (Massachusetts avenue, Eighth and B streets NE.).—A wire fence was erected on the east side of this reservation.

Reservation 124 (Virginia avenue, Seventh and K streets SE.).—The work of raising this reservation to the new grade established by the District Commissioners for Virginia avenue, which was commenced in May, 1907, was completed in July, 1907. The clay required for raising the surface was received without expense to the United States. Upon this soil was spread to a depth of 4 inches and grass seed sown. As the ground on the south and west sides is much lower than on the other sides, a 9-foot slope was made on the former sides and sodded. The water box and valve were raised to grade and wire fences erected at the corners to prevent trespassing.

Reservation 126 (Virginia and Georgia avenues and K street, between Ninth and Eleventh streets SE.).—This reservation is used as a children's playground. It has been maintained in as good condition as possible. The cinder paths were repaired, washouts in the ground filled up with clay, the trees were restaked, water hydrants repaired and dippers placed on them.

Reservation 203 (Maryland avenue, First and A streets, NE.).—The District government laid a cement pavement on the public sidewalk on the Maryland avenue (north) side of the reservation by permission of the Chief of Engineers dated September 23, 1907, under the authority granted by the act of Congress approved July 1, 1898. The cement coping on that side was necessarily destroyed in doing that work, and was rebuilt by this office in April, for a length of 179 feet, with three cement corner posts. The ground back of this coping was raised to grade and resodded, and depressions in the lawn surface filled with soil and sodded. The gravel walks were repaired and the tree parking on the edge of the sidewalk was graded and sown with grass seed.

Reservation 204 (Maryland avenue, Second and B streets NE.)—A cement pavement was also laid by the District government on the Maryland avenue (south) side of this reservation, and a strip of the

reservation 5 feet wide appropriated by them, under permission from the Chief of Engineers granted as in the case of reservation 203, in order to make the sidewalk 5 feet wider than the old one. To do this, the iron post and chain fence had to be taken down. After the pavement was laid, the border of the reservation was graded down and sodded by this office, and the tree parking on the outer edge of the new sidewalk was graded and sown with grass seed.

Under date of October 31, 1907, the Chief of Engineers granted the owner of the private land adjoining this reservation permission to continue to fence in and care for a small triangular piece of ground at the base of the reservation at his own expense, under the authority granted by section 2 of the act of Congress, approved July 1, 1898 (30 Stats., p. 570).

Reservation 314 (Pierce street, between Jackson and Washington streets, Anacostia, D. C.)—This reservation was transferred to the Chief of Engineers on June 27, 1907, by the Commissioners of the District of Columbia under the provisions of the act of Congress approved July 1, 1898 (30 Stat., p. 570). It is a parallelogram located in the center of Pierce street, is 260 feet long and about 40 feet wide, and contains 10,354 square feet. It is inclosed with a street curb, and has a row of elm trees on either side. When transferred, it was only roughly graded and had been used as a playground. In April and May, 1908, it was partially improved by this office to the extent that funds would allow. The grade was raised with clay hauled without expense to the United States, top soil spread, grass seed sown, and water introduced by laying 24½ feet of 1¼-inch galvanized-iron pipe and 38 feet of 1-inch lead pipe. At the request of the Anacostia Citizens' Association and others the reservation was on July 8, 1908, with the approval of the Chief of Engineers, given the name of "Logan Park," in honor of the late Gen. John A. Logan.

TREES, SHRUBS, PLANTS, FERTILIZERS, AND SKILLED LABOR FOR THE GROUNDS OF THE LIBRARY OF CONGRESS.

The grounds received a good coating of thoroughly decayed stable manure during the winter months, which was removed in the early spring and the grounds left in good condition.

The shrubs that were killed during the winter months were reremoved and replaced from the stock at Potomac Park nurseries which were purchased for this purpose.

Trenches were dug at Potomac Park nurseries and the evergreens planted therein that were purchased during the fiscal year ending June 30, 1908. The evergreens and those purchased prior to this year were kept watered and cultivated. These evergreens will be used in the remodeling of the eight evergreen beds at the Library during the ensuing fall.

Purchased during the fiscal year:

Evergreen shrubs		254
Manure	cubic yards	200 7/27

Replanted 75 evergreen shrubs that were winter killed.

TREES, SHRUBS, PLANTS, FERTILIZERS, AND SKILLED LABOR FOR THE GROUNDS OF THE CAPITOL.

The 58 flower beds and vases on the terraces of the Capitol building were maintained in good condition during the fiscal year ending June 30, 1908. In October, 1907, the summer-flowering and tropical plants were removed to their winter quarters at the Propagating Gardens. The soil in these beds and vases was renewed and they were filled with dwarf evergreens and spring-flowering bulbs. Early in May of the present year such of these shrubs that were not winter-killed were removed and planted in Potomac Park nursery for future use. The flower beds and vases were dug and again refilled with tropical and summer-flowering plants, and the fountains at the east and west side of the Capitol were filled with aquatic plants.

During the winter months the lawns at the western approach of the Capitol grounds were given a good coating of well-rotted stable manure. The approaches at the east and west ends of the Capitol building from which the shrubs were removed during the construction of the subways to the House and Senate office buildings were replaced and as far as practicable restored to their former condition.

The refuse was removed from the inner courtyard of the House of Representatives Office Building and the ground rough graded.

The number of evergreens, plants, and bulbs, and the amount of fertilizer purchased during the fiscal year were as follows:

Evergreens		214
Palms and flowering plants		314
Spring-flowering bulbs		8,800
Manure	cubic yards	246 $\frac{8}{27}$

Planted in flower beds and vases for summer decoration 14,500 miscellaneous flowering and foliage plants.

Planted in flower beds and vases for winter decoration 1,500 dwarf evergreens and vines.

Planted in the east and west approaches of Capitol 300 evergreens and flowering shrubs to replace those that died from removal during the building of the subways.

BAND CONCERTS.

The concerts by the engineer band from the Washington Barracks and the cavalry band from Fort Myer, which, with the approval of the Secretary of War, were inaugurated in the summer of 1904, were resumed in June, 1907, continued until the end of September, 1907, and again commenced in June, 1908. The concerts were given on Mondays, Tuesdays, Thursdays, and Fridays. From July 1 to September 13, 1907, and in June, 1908, the concert hours were from 7.30 to 9 p. m. and from September 16 to 30, 1907, they commenced one and one-half hours before sunset and terminated at sunset.

Concerts were given in the following-named parks during the year:

Judiciary Park.—July 1, 5, 11, 16, August 1, 9, 15, 22, 29, September 5, 12, 19, 24, 1907; June 9, 16, 23, 29, 1908.

Smithsonian grounds.—July 12, 18, August 2, 12, 27, September 3, 16, 27, 1907; June 8, 22, 1908.

Franklin Park.—July 8, 23, August 5, 19, September 6, 17, 1907; June 15, 26, 1908.

Iowa Circle.—July 15, 25, 30, August 16, 30, September 9, 1907; June 18 1908.
Dupont Circle.—July 19, August 23, September 23, 1907; June 25, 1908.
Washington Circle.—July 29, August 13, September 10, 30, 1907; June 5, 19, 1908.
Garfield Park.—July 2, 9, 22, August 6, 26, September 20, 1907; June 1, 11, 30, 1908.
Lincoln Park.—July 4, 26, August 8, 20, September 2, 13, 26, 1907; June 4, 12, 1908.
Reservation 314 (Logan Park), Anacostia, D. C. (Pierce street, between Washington and Jackson streets).—June 2, 1908.

To accommodate the bands, a portable band stand, consisting of trestles and a platform in sections, and camp stools were provided, and they were hauled to the park the day of the concert and removed therefrom the day following. Lamps were provided at the night concerts, so that the musicians could read the music. Ice water was also provided for the comfort of the members of the bands.

In addition to the concerts mentioned above, the usual Wednesday afternoon concerts in the Capitol grounds and the Saturday afternoon concerts in the White House grounds were given by the Marine Band from July 1 to September 30, 1907, and in June, 1908.

PROPAGATING GARDENS, INCLUDING GREENHOUSES AND NURSERY.

The various greenhouse structures were maintained in as good condition as the small appropriation would permit, and the plants were given necessary care and attention.

Woodwork was repaired and painted, broken glass replaced with new glass, and some of the glass roofs reputtied. Braces made of ⅝-inch round iron were placed in two of the houses to prevent the roofs and sides from spreading. The east fronts of seven of the houses were repainted, and other miscellaneous painting done. The entire wooden and glass superstructure of house No. 5, which is 100 feet long, 12 feet wide, and 9 feet high, was rebuilt and new plant benches erected entire. The glass from the old superstructure was used in the new work. A cold frame 120 feet long, 6 feet wide, and 15 inches deep was also reconstructed. Necessary 1½-inch black pipe was laid to connect the electric pump with some of the houses so that manure water from the tank could be supplied them. A new boiler, purchased in the preceding year, was set and connected to the heating pipes in six houses for heating those houses. The exposed surfaces of all the heating boilers were painted, leaking pipes recalked, and the boilers repaired where needed. An old heating boiler was cut out from the office building and a connection made with one of the greenhouse boilers. Extensive repairs are needed to some of these houses and to their heating apparatus, and I have asked for an additional appropriation of $3,000 for the purpose.

In the nursery grounds the lawns, roads, walks, and drains were cared for and the stock cultivated. The privet hedge bordering a portion of the grounds was trimmed for a length of 2,150 feet.

This office is frequently in receipt of requests for the loan of plants from the gardens for the use of churches, fairs, festivals, etc., and requests are often made for flowering and decorative plants for private purposes.

All such requests have to be declined, as either the loan or gift of any plants would be in violation of the following extract from the act of Congress, approved June 30, 1878:

Provided, That hereafter only such trees, shrubs, and plants shall be propagated at the greenhouses and nursery as are suitable for planting in the public reservations, to which purposes only the said productions of the greenhouses and nursery shall be applied.

In addition to the plants (nearly 850,000) propagated at these gardens for the reservations under the charge of this office, there were also propagated about 21,000 plants for other departments of the Government. After those were supplied the surplus remaining (about 21,700) were distributed to hospitals, Government offices, and to whoever asked for them. Appended hereto is a list showing the stock grown, purchased, planted in the parks, and distributed during the year:

List of stock propagated, purchased, planted, and distributed.

	Number.	Kinds.	Number of varieties.
PROPAGATED.			
Plants for stock and park plantings	790,930	17	43
Plants for greenhouses, nursery and fall plantings	57,000	27	180
Plants for grounds of Treasury Department	900	7	10
Plants for grounds of State, War, and Navy Department	3,230	8	12
Plants for the grounds of United States Capitol	14,500	(a)	(a)
Plants for the Bureau of Engraving and Printing	1,210	(a)	(a)
Plants for the Interior Department	500	(a)	(a)
Plants for the Bureau of Insular Affairs	300	(a)	(a)
SURPLUS STOCK DISTRIBUTED AS FOLLOWS.			
Casualty Hospital	500	(a)	(a)
Children's Hospital	500	(a)	(a)
Columbia Hospital	500	(a)	(a)
Episcopal Eye, Ear, and Throat Hospital	500	(a)	(a)
Freedmen's Hospital	500	(a)	(a)
Garfield Memorial Hospital	700	(a)	(a)
National Homeopathic Hospital	500	(a)	(a)
Providence Hospital	500	(a)	(a)
Sibley Hospital	500	(a)	(a)
Little Sisters of the Poor	500	(a)	(a)
Corcoran Art Gallery	500	(a)	(a)
Louise Home	500	(a)	(a)
Home of the Aged and Infirm	200	(a)	(a)
Young Woman's Christian Home	300	(a)	(a)
Fire Department	1,800	(a)	(a)
Public schools	1,200	(a)	(a)
General public	12,000	(a)	(a)
Total	890,270		
PURCHASED.			
Hardy flowering bulbs	31,500	4	18
Tender flowering bulbs	16,000	3	3
Plants	603	9	54
Trees	177	8	18

[a] General stock.

Grown in greenhouses for autumn, winter, and spring bloom:	
Chrysanthemums	3,504
Carnations	5,100
Poinsettias	500
Roses	2,538
Smilax	200
Violets	1,200
Cinerarias	1,200
Primulas	500
Stevia	1,200
Tropical plants	12,500
Potted and boxed for winter forcing:	
Roman hyacinths	10,000
Narcissus	3,000
Lily of the valley	3,000
Planted at propagating gardens:	
Asters	2,000
Cannas	36
Cosmos	1,000
Dahlias	400
Gladiolii	3,800
Planted at propagating gardens—Continued.	
Heliotrope	1,200
Tuberoses	2,400
Geraniums	200
Miscellaneous	10,000
Planted in various reservations, including West Potomac Park:	
Trees	340
Shrubs	1,660
Planted in parks for spring bloom:	
Bulbs	30,500
Pansies	20,000
Sent out to parks in May and June:	
Bedding plants	790,930
Tropical plants	10,000
Vases stocked:	
Vases	15
Plants	430
Fountains:	
Fountains	3
Water lilies	24

Storehouse and shops building, propagating gardens.—The tools, supplies, and other Government property in the storehouse were cared for. The down spouts on the building were repaired.

A sale of old, unserviceable, and condemned materials and tools was had on March 20, 1908, and the gross proceeds thereof, amounting to $139.80, deposited in the Treasury of the United States. Of this amount $20.85 was for property belonging to the Washington Monument. At the shops building 100 feet of new 6-inch galvanized-iron gutter and four new down spouts were put up.

Settees, tools, manure, repair of post-and-chain fences, removing snow and ice, and park lodges.—During the year 600 park settees were painted and 214 repaired, and all loose settees in the parks were refastened to the ground by stakes.

Repairs were made to lawn mowers, wheelbarrows, and miscellaneous tools, edge tools sharpened and kept in good order, and new tools purchased from time to time as required.

There were purchased 287 cubic yards of stable manure, and this, with manure received from Government stables, and over 1,200 cubic yards received from other sources without expense to the United States, was piled in the compost grounds at Nineteenth and B streets NW. About 1,260 loads of this manure, when well rotted, were hauled out to the various parks in November and December, 1907, and spread over the lawns. In the spring this manure was raked in and the refuse removed. The compost grounds above mentioned are located on the Potomac Flats (Potomac Park), and as these flats were to be used as a place of deposit for material dredged from the tidal reservoir, an earthen embankment 4 feet high was built during July, 1907, on the east and south sides of the manure piles to prevent them from being covered with the liquid dredgings. About 3,000 cubic yards of earth were used in constructing these embankments, the material having been hauled in without expense to the United States. After the filling of the flats is completed it is probable that these compost grounds will be moved farther south near the drainage canal.

Repairs were made to iron post and chain fences, as required. An iron post and chain fence was erected around reservation 148, the iron post and bar fences around two reservations, and the iron post and chain fences around three reservations were removed and replaced with cement copings, and nearly 10,000 of the hooped iron guards, used as protecting fences around flower beds, and to prevent trespassing, were straightened, cleaned and painted.

The snow and ice were removed as soon as possible after storms from the walks around and through the various parks and park places. Where, through freezing, the snow could not readily be removed, sand was sprinkled and the slush and dirt removed as soon as a thaw set in. There were in all six falls of snow during the period from December 4 to February 18. The annual allotment of $1,200, made for removing snow and ice, was more than sufficient for the work, there being an unexpended balance of $173.76 remaining after the last storm.

New galvanized-iron gutters were placed on five of the park lodges; the interiors of three of the lodges, the exteriors of two, the roofs of two and the exteriors of three tool houses, were painted, and broken glass in windows replaced with new glass. The plumbing of the closets in the lodges was also given attention, and repairs made as required.

WATER PIPES, DRAIN PIPES, AND FOUNTAINS.

Repairs were made to water pipes and valves where necessary and new valves put on. In the autumn the water was shut off from the various parks, the hose valves removed and taken to the shops at the nursery and repaired during the winter. In the spring the valves were replaced on the pipes and the water turned on. During the year the following additional water pipe was laid in the parks as mentioned elsewhere in this report: Two thousand six hundred and fifty-four feet of 6-inch cast-iron pipe; 103 feet of 3-inch cast-iron pipe, 150 feet of 2-inch galvanized-iron pipe, 215 feet of 1½-inch galvanized-iron pipe, 500 feet of 1-inch lead pipe, and 3,068 feet of 1¼-inch galvanized-iron pipe, being a total of 8,737 feet.

Stoppages were removed from drainpipes in the public grounds and repairs made to broken pipes as required. The following quantities of additional drainpipe were laid during the year: Six hundred and twenty feet of 10-inch terra-cotta pipe, 105 feet of 8-inch terra-cotta pipe, 1,771 feet of 6-inch terra-cotta pipe, and 70 feet of 4-inch drain tile, being a total of 2,566 feet. Forty-three additional brick catch basins were constructed.

The large fountains and their jets were cleaned weekly, except during the winter. Repairs were made to their basins, supply and overflow pipes and valves, and new overflows and valves put on where needed. Seven of the iron fountains were painted. The water was shut off for the winter as usual, the jets taken off and kept in the storehouse until spring, when they were replaced and the water turned on.

Necessary attention was paid to the drinking fountains, stoppages removed from their waste pipes, their supply pipes and valves repaired, and new ones put on where needed. New tinned dippers were put on where needed, and five of the fountains were painted. The

water was turned off for the winter months. One additional drinking fountain was erected during the year.

MISCELLANEOUS PLANTINGS.

In addition to the trees mentioned elsewhere as planted in Potomac Park, there were planted in other portions of the public grounds 158 trees and 1,060 shrubs.

FISH PONDS, MONUMENT GROUNDS.

As reported in last annual report, this office assumed charge of these ponds on June 9, 1907, under authority contained in general deficiency act approved June 30, 1906. In July, 1907, a small greenhouse at the ponds was taken down and the material of which it was built, together with a small steam boiler, 10 radiators and pipes, were taken to the propagating gardens and stored for future use.

LIGHTING THE PUBLIC GROUNDS.

The following parks are lighted with arc electric lights:

	Lights.
Executive Mansion grounds	5
President's Park	9
Monument Park	12
Franklin Park	9
Judiciary Park	9
Lincoln Park	8
Layfayette Park	6
Propagating gardens	6
Potomac Park driveways	27
Total	91

Of the 27 lights in Potomac Park, 18 are on the driveway extending from Seventeenth and B streets NW. to Maryland avenue and Fourteenth street SW., and 9 are on the driveways in East Potomac Park, which is situated between the Virginia channel, the causeway of the Pennsylvania Railroad bridge, and the tidal reservoir. Only 17 of the lamps were in operation during the year, the 9 posts in East Potomac Park and 1 of the poles on driveway near Fourteenth street and Maryland avenue not having been erected until the last week in June, 1908 (the conduit having been laid and the 10 poles erected between June 23 and July 1), owing to the fact that the improvements in those portions of the park could not be completed in time to permit of the erection of the poles at an earlier date. The lamps were placed on the 10 poles mentioned on July 11, 1908, and lighting commenced on July 14, 1908.

The nuber of gaslights in the public grounds not connected with meters lighted during the year was 226, from July 1, 1907, to June 7, 1908, and 232 from June 8 to 30, 1908. Six additional lamp posts were erected in Stanton Park in May, 1908, equipped with lamps and lighted from June 8, 1908. All these lamps are equipped with mantle burners of high candlepower.

REPAIR OF ASPHALT PAVEMENTS.

The following tabulated statement shows the area of asphalt roadway and foot-walk pavements constructed and repaired during the year:

Location.	New walks constructed.	Repairs to walks.	Repairs to roadways.
	Sq. yards.	*Sq. yards.*	*Sq. yards.*
Dupont circle	.....	64.4	.....
Farragut Park	.....	21.7	.....
Henry Park	.....	286.4	.....
Judiciary Park	.....	71.0	125.0
Lincoln Park	33.1	50.0	.....
Stanton Park	260.91	160.0	.....
Smithsonian grounds	154.0	169.2	4,830.7
Reservation 30, Pennsylvania avenue, Nineteenth and H streets NW	.....	20.0	.....
Reservation 33, Pennsylvania avenue, Thirteenth and E streets NW	172.7	.....	.....
Reservation 35, Pennsylvania avenue, between Eighth and Ninth streets NW	42.2	18.0	.....
Reservation 68, Massachusetts avenue, Twelfth and L streets NW	.....	69.2	.....
Reservation 69, Massachusetts avenue, Tenth and L streets NW	.....	166.2	.....
Reservation 74, Massachusetts avenue and I street, between Fourth and Fifth streets NW	.....	153.0	.....
Reservation 144, New Hampshire avenue, Seventeenth and S streets NW	.....	20.0	.....
Reservation 173, New York avenue, Twelfth and I streets NW	.....	45.8	.....
Reservation 174, New York avenue, Tenth and I streets NW	.....	55.1	.....
West Executive avenue	.....	.....	15.0
Total	662.91	1,310.0	4,970.7

STATUES.

There are now 25 statues in the public grounds under the charge of this office and 11 in contemplation.

Lists of all but six of these statues were printed in the Annual Reports of this office for 1903 and 1904. The four not included in those lists are, first, a statue to the memory of Commodore John Barry, for which the sum of $50,000 was appropriated by act approved June 8, 1906 (Public, No. 206); second, a statue to the memory of John Paul Jones, for which $50,000 was appropriated by act approved June 8, 1906 (Public, No. 208); third, a statue of Longfellow, to be provided by the Longfellow Memorial Commission, Congress having appropriated the sum of $4,000 for a pedestal for it by public resolution approved June 8, 1906 (Public, No. 25); fourth, a suitable memorial to the memory of Christopher Columbus, for which $100,000 was appropriated by act approved March 4, 1907 (Public, No. 267); fifth, the Stephenson Grand Army Memorial, to be presented by the Grand Army of the Republic to the people of the United States, Congress having appropriated the sum of $10,000 for a pedestal for it by Public Resolution No. 23, approved March 4, 1907; and sixth, a bronze statue of John Witherspoon, a signer of the Declaration of Independence, to be provided by the Witherspoon Memorial Association, Congress having appropriated the sum of $4,000 for the preparation of a site and the erection of a pedestal for said statue by Public Resolution No. 31, approved May 29, 1908.

Attention has been paid to the various statues during the year, and the pedestals and bronze figures have been maintained in a cleanly condition so far as possible.

The following reports show the status of the statues now under contract or in contemplation, and the work accomplished during the year:

MEMORIAL TO GEN. ULYSSES S. GRANT.

On July 24, 1907, a supplemental contract was entered into between the commission and the sculptor and architect, providing that certain changes be made in the design of the memorial to better fit it to the site selected for it in the Botanic Garden grounds. These changes contemplated shortening the memorial 10 feet, lowering it 1 foot, omitting the balustrade at the rear, and substituting therefor steps similar to those for the front.

On September 28, 1907, this office was notified by the subcontractors for the foundation and marblework that they would commence on October 1 excavating for the foundation, and on that day work was commenced by this office laying out the lines of the memorial on the site. On October 7 the subcontractors commenced excavating for the foundation. On October 8 this office was served with a temporary restraining order issued by the supreme court of this District directing an appearance of the commission's executive officer in court on October 18 to show cause why he should not be enjoined from cutting down or causing to be cut down or destroying certain trees in the Botanic Garden grounds for the purpose of erecting the memorial. Under this order the excavating was temporarily suspended at noon on October 9. On October 18 the chairman of the commission telegraphed that work be suspended and the subcontractors were notified on October 19 that no further work in connection with the foundation would be permitted until further notice. At the hearing on October 18 the court postponed the hearing of arguments until October 23, and on the latter date the court postponed a decision on the application for a permanent injunction, on the ground that work had already been stopped by order of the Memorial Commission.

On October 26 two of the four bronze lions intended to flank the center pedestal were received in this city and stored.

On November 12 the advisory committee to the Commission visited the grounds and recommended to the Commission that the site originally selected be retained, and that the trees standing thereon be removed to another location.

On January 11, 1908, the Commission approved the quarter-size model submitted by the sculptor for the bronze artillery group proposed for one end of the memorial, and on February 27 the remaining two of the four bronze lions were received from the bronze founders and stored.

On April 2, 1908, by order of the Commission, work was commenced for moving three historic trees which stood on the site selected for the memorial. The work was completed on the 8th of the month. The "Crittenden oak" and the "Shepherd elm" were replanted on the north side of the Gardens between First and Second streets, and the "Beck elm" was planted on the south side between the same streets.

On May 18, 1908, work for constructing the foundations was recommenced by the subcontractors, has been continued, and is now in progress. By the end of June the foundation for the center pedestal was about completed, the foundations for the two end pedestals nearly

completed, and the concrete arched foundations between the pedestals well advanced. It is expected that the entire foundation work will be finished before the end of July, 1908, and operations will then be commenced for setting the marble work.

STATUE OF GEN. PHILIP H. SHERIDAN.

By direction of the Commission, this office early in July, 1907, selected a sculptor to produce this statue. This selection was approved, and on July 26, 1907, the Commission entered into a contract with that sculptor for constructing, completing, and erecting the statue in Sheridan Circle, at Massachusetts avenue and Twenty-third street, between Q and R streets NW. On January 8, 1908, the sculptor submitted a small plaster model of the statue and pedestal, which was approved by the Commission on January 17. The sculptor immediately commenced modeling the full-size clay model of the equestrian group. This was completed in June, has been approved by the Commission, cast in plaster, and that cast sent to the founders to be cast in bronze. The sculptor expects to have the entire monument completed and erected so that it can be unveiled in November of 1908.

STATUE OF GENERAL COUNT PULASKI.

The sculptor selected to produce this statue submitted a second sketch model, which was approved by the Commission, and a contract entered into on February 18, 1908, with him for the production and erection of the statue and pedestal in United States Reservation No. 33, at the intersection of Pennsylvania avenue, Thirteenth and E streets NW. The contract provides for the completion of the statue within two and one-half years from date of contract.

STATUE OF GENERAL BARON VON STEUBEN.

In August, 1907, the Commission approved the working model submitted by the sculptor, and in June, 1908, the model of the bronze group representing "Military Instruction," which is to be placed on the right side of the pedestal, was also approved.

STATUE OF GEN. THADDEUS KOSCIUSZKO.

This statue is to be presented to the United States by the Polish-American organizations and the Polish-American people of the United States. It is to be erected at the northeast corner of Lafayette Park. In March, 1908, the Commission approved the full-size model of the statue submitted by the sculptor, who has been commissioned by the Kosciuszko Monument Central Committee to produce the statue.

STATUE OF THOMAS JEFFERSON.

Sundry civil act approved April 28, 1904, created a commission, composed of the Secretary of State, the chairman of the Committee on the Library of the Senate, and the chairman of the Committee on the Library of the House of Representatives of the Fifty-eighth Congress, to select a site on the public grounds of the District of Columbia for a statue of Thomas Jefferson, and appropriates the sum of

$5,000 to procure plans for the same. At the request of the Secretary of State, the officer in charge of this office will act as executive and disbursing officer of the Commission.

STATUE OF JOHN PAUL JONES.

Congress, by act approved June 8, 1906 (Public, No. 208), appropriated the sum of $50,000 for the erection in the city of Washington of a statue to the memory of John Paul Jones, and created a commission, of which the Secretary of War is the senior member, to select a site for the statue on ground belonging to the Government other than the grounds of the Capitol or Library of Congress.

At its first meeting held on April 16, 1908, the Commission elected the officer in charge of public buildings and grounds as its executive and disbursing officer, and in June, 1908, selected a sculptor to produce the statue, which it is proposed to erect on the north side of Franklin Park midway between Thirteenth and Fourteenth streets, NW. A contract will be entered into between the Commission and the selected sculptor for the execution of the work.

STATUE OF COMMODORE JOHN BARRY.

The Commission at its meeting held on April 16, 1908, approved the programme of competition prepared, and submitted to it by this office in March, 1907. The programme has been sent out to all artists applying for it. It provides that all artists who enter the competition shall submit their model between December 1 and 15, 1908. It is proposed to erect this statue on the south side of Franklin Park midway between Thirteenth and Fourteenth streets NW.

STATUE OF LONGFELLOW.

This statue is to be provided by the Longfellow Memorial Association, and will be placed upon a pedestal to be erected by the United States. On March 21, 1908, the Commission entered into a contract for the erection of the pedestal in United States Reservation No. 150, at Connecticut avenue, Eighteenth and M streets, NW. This contract provides that the pedestal shall be erected and ready to receive the statue within eighteen months after the date of the contract.

MEMORIAL TO CHRISTOPHER COLUMBUS.

On February 4, 1908, the Commission selected as a site for this memorial the plaza in front of the new Union Railroad Station. On March 19, 1908, the Commission accepted a design submitted by the architects of the Union Station for the architectural treatment of the memorial and directed its executive and disbursing officer to prepare a programme of competition for the sculpture proposed for the memorial. This was done, the programme printed, and copies have been sent to all artists applying for it. The programme provides that each competitor for the sculptural work of the memorial shall submit a sketch model of his design, said model to be delivered in this city on or before December 1, 1908.

STEPHENSON GRAND ARMY MEMORIAL.

Public Resolution No. 23, approved March 4, 1907, created a Commission composed of the chairman of the Committee on the Library of the Senate, the chairman of the Committee on the Library of the House of Representatives, the Secretary of War, and the secretary and treasurer of the Stephenson Memorial Committee of the Grand Army of the Republic, with authority to select and prepare a site and erect a pedestal, for which $10,000 was appropriated, upon which to place the above memorial, which was to be presented by the Grand Army of the Republic to the people of the United States. On January 22, 1908, the Commission selected the circle (United States reservation No. 36 A), at the intersection of Louisiana avenue, Seventh and C streets NW., as the site for the memorial. On February 29, 1908, the Commission approved a model of the memorial submitted by the sculptor selected to do the work, and on April 4, 1908, entered into contract with him for constructing and erecting a pedestal for the same. The contract provides that the pedestal shall be completed and ready to receive the memorial within seventeen months from the date of the contract.

STATUE OF JOHN WITHERSPOON.

Public Resolution No. 31, approved May 29, 1908, created a Commission, composed of the chairman of the Committee on the Library of the Senate, the chairman of the Committee on the Library of the House of Representatives, the Secretary of War, and the chairman of the Witherspoon Memorial Association, to select and prepare a site and erect thereon a suitable pedestal, for which the sum of $4,000 was appropirated, for a statue in bronze of John Witherspoon, a signer of the Declaration of Independence, to be provided by the Witherspoon Memorial Association.

The Commission has selected as a site for the memorial United States reservation 150 A, at the intersection of Connecticut avenue, Eighteenth and N streets NW., and the artist who has been selected to produce the work has submitted for the consideration of the Commission a set of drawings containing designs for the pedestal.

DEPARTMENTAL TELEGRAPH LINE.

This is an overhead line, with the exception of three short sections, which are underground. The line of overhead wires consists of 76 poles, covering a distance of about 3 miles, with a length of 14 miles of wire. The line starts from the Lemon Building (1729 New York avenue), where the main storage operating battery is located, and runs overhead to the corner of Seventeenth and G streets, thence underground by 250 feet of 20 conductor cable into the State, War, and Navy Departments building, thence to the White House and the Treasury Department building, and thence by 4,600 feet of 10 conductor cable underground to Fourteenth and G streets NW., and down Fourteenth to B street NW., entering the Department of Commerce and Labor en route. From Fourteenth and B streets NW. the line runs overhead on poles of the Western Union Telegraph Company to Twelfth and B streets and over to the Post-Office Depart-

ment building, returning by a loop into the Department of Agriculture, and thence back to the cable pole at Fourteenth and B streets. From the Treasury Department there is an underground connection by 1,300 feet of 6 conductor cable up Fifteenth street to a pole in alley between H and I, and from thence by aerial cable to the Department of Justice on K street near Fifteenth street. From Fourteenth and G streets NW. the line runs overhead along G street to Eighth into the Interior Department, thence to H to North Capitol street into the Government Printing Office, thence south on North Capitol street to B street north, and thence by 500 feet of 13 conductor cable underground into the Capitol building. Connected with the main overhead line on H street there is a short line down an alley between Fifth and Sixth and G and H streets into the Pension Office building.

There are 15 local offices on the line, each having two circuits and two sets of instruments. Each office has a local battery, except the Interior Department, which has box instruments. The main battery in the Lemon Building consists of two sets of storage batteries of 50 cells each.

During the year the main and local batteries received necessary attention and were maintained in good working order. All crosses and other obstructions on the wires of the line were removed as soon as possible, instruments maintained in good condition, and necessary repairs made to the line wires.

The instruments belonging to the offices in the United States Senate and the House of Representatives, which had been stored during the recess of 1906, were replaced upon the operators' tables in time for the opening of Congress in December of that year and removed therefrom when Congress adjourned on May 31, 1908, and will be carefully stored during the recess.

The local batteries in those offices were discontinued and replaced by electric light current with incandescent light bulbs for resistance. This is a simple and economical method of supplying local circuits for telegraph sounders and is satisfactory to the operators in those offices.

One of the poles on the south side of G street between Eleventh and Twelfth streets was moved about 4 feet east of its former location, at the request of the owner of a new building being erected there, he agreeing to pay for the extra labor required to move the pole. The local office in the Department of State was moved from a room on the third floor to one on the second floor, and all necessary reconnections made. The local office at the Government Printing Office was also moved from one room to another. The overhead wires of the line running along North Capitol street between the Government Printing Office and Capitol Building were carefully gone over, all slack pulled up and cut out, and necessary repairs made. An old decayed fixture on roof of old building of Government Printing Office was removed and replaced with a new fixture. Repairs were also made to a defective cable on the roof of that building. A new cable box was put up, the cable connected to it, and the old box removed. The cable box on top of iron pole in Capitol Grounds was newly wired. Repairs were made to overhead lines on G street between Tenth and Twelfth streets NW. and at Fourteenth and B streets NW.

An estimate is submitted and recommended for an appropriation to place the line underground in conduits which have just been constructed by the Western Union Telegraph Company.

OLD LAND RECORDS OF THE CITY OF WASHINGTON.

The act of Congress approved March 3, 1896, authorized and directed the Secretary of War to correct the records of the Department in respect of certain lots in the city of Washington. The old records referred to are the old land records in this Office, and between the date of the act and June 30, 1908, they have been corrected in the cases of 23 of the lots.

EXTENSION OF BUILDINGS BEYOND THE BUILDING LINES IN THE CITY OF WASHINGTON.

The act of Congress approved March 3, 1891 (Vol. 26, Stat. L., 868), as amended by the act approved June 21, 1906 (Vol. 34, Stat. L., part 1, p. 385), provides for the approval of the Secretary of War on applications for projections on buildings that are to be erected on lots adjoining United States public reservations.

By direction of the Secretary of War this Office is charged with the duty of investigating and reporting upon these cases. During the fiscal year ending June 30, 1908, there were no applications of that character referred to this Office by the War Department.

RESERVATIONS WHICH ARE THE PROPERTY OF THE UNITED STATES OCCUPIED, IT IS BELIEVED, IN VIOLATION OF LAW.

[See map in Annual Report for 1894.]

The following reservations, the property of the United States, are now occupied, it is believed, without authority of law:

Reservation No. 186, by the Bethany Chapel of the New York Avenue Presbyterian Congregration.

Reservation No. 249 is occupied as a lumber yard by a man who claims to rent it from a man in Port Deposit, Md.

Reservations Nos. 137, 138, 152, 164, and 169 have been inclosed with iron or wire fences and partially improved by the owners of adjacent property.

The following also are improved and utilized by adjacent property owners: Nos. 61, 65, 67, 139, 141, 142, 143, 161, 162, 167, 168, 175, 208, and 284.

Reservations 61, 141, and 142, above mentioned, are occupied under permits granted the owners of the adjacent property by the Chief of Engineers, under authority of the act of Congress approved July 1, 1898.

In addition to the foregoing there is a valuable piece of United States ground, known as reservation No. 94a, lying between Rock Creek and Twenty-eighth street west, between I and K streets north, of which certain persons are now in unlawful occupation. This Office has for several years been making efforts to secure possession of the property, which have so far proved unsuccessful. This case is reported upon on page 3929 of the Annual Report of the Chief of Engineers for 1904.

MONUMENT AND WHARF AT WAKEFIELD, VA., THE BIRTHPLACE OF WASHINGTON.

The United States watchman in charge extended the usual care to this property, and during the growing season he kept the grass cut around the monument.

In addition to this, a force of laborers in May and June, 1908, was employed under his direction cutting down and cleaning out the undergrowth from the roadway leading from the United States wharf to the monument. Repairs were also made to the wire fence running along either side of this roadway by putting in 175 new posts, repairing and tightening the wire where needed, and rehanging and painting the gates in the fence. The iron fence inclosing the monument was painted, the grounds around the monument cleaned of all undergrowth and rubbish, and the trees trimmed. The bank of the creek was also cleared of all undergrowth and all rubbish burned.

The foregoing work was done at a cost of about $363, leaving an unexpended balance of $137 to be returned to the Treasury of the $500 appropriated by Congress for the work.

UNITED STATES WHARF PROPERTY, WASHINGTON, D. C.

By act of Congress approved March 3, 1899, entitled "An act relative to the control of wharf property and certain public spaces in the District of Columbia," the following-described property is placed under the immediate jurisdiction and control of the Chief of Engineers of the United States Army:

The banks of the Potomac River from the north line of the Arsenal grounds to the southern curb line of N street south. * * *

By letter of March 11, 1899, from the Office of the Chief of Engineers, this Office was directed, as representative of the Chief of Engineers, to assume control of the said wharf line, and since that date it has been in charge of this Office. No work has been done during the year, as there are no funds available for either the improvement or care of the property.

On November 12, 1907, the Chief of Engineers executed a lease with H. H. Hempler for a water lot 20 by 50 feet at the foot of Sixth street SW., opposite lot No. 12, in square 503, for use in constructing a staging for landing boats; consideration, $25 per annum. This lease was revoked June 19, 1908, at the request of Mr. Hempler.

On December 27, 1907, the Chief of Engineers executed a lease with J. R. Lindsay, trustee, for an existing wharf and the water area on the south side thereof, located at the foot of Sixth street SW. and opposite lot No. 14, in square 503.

The following-described leases, made by the Chief of Engineers, are also in force:

June 16, 1903, with Thomas R. Riley for wharf and building thereon at foot of Sixth street, opposite lot 13, square 503. Consideration, $50 per month, in advance.

July 13, 1903, with Edward Whyte for wharf and building thereon between O and P streets, opposite lot 11, in square 504. Consideration, $5 per month, in advance.

September 2, 1903, with Thomas Banks for dock, wharf, and buildings foot of Sixth street, opposite lot 14, in square 503. Consideration, $7.50 per month, in advance.

January 18, 1906, with Corinthian Yacht Club, land and water lot opposite lot 16, square 503, with right to erect a boathouse thereon. Consideration, $18.75 per quarter, in advance.

August 22, 1906, with the Corinthian Yacht Club for the use of two water lots on the river front opposite lots 17 and 18, in square 503, with the privilege of building wooden walk ways around three sides of the water lots, for fastening boats and gaining access to them. Consideration, $18.75 per quarter, in advance.

March 26, 1907, with George W. Webber for the use of a wooden building on the south side of Water street, opposite lot 14, square 503, for use as a blacksmith and boiler repair shop. Consideration, $5 per month, in advance.

The lease entered into on August 12, 1906, between the Chief of Engineers and R. M. Allen & Co. for a water lot opposite lot 10, in square 504, ceased under its own terms on August 31, 1907, by virtue of the failure of the lessees to pay the rental therefor after that date.

SUMMARY OF WORK DONE DURING THE YEAR.

For convenience of reference a brief summary of the more important items of work accomplished during the year is given, as follows:

Executive Mansion.—The fixtures in one of the toilet rooms renewed and the room retiled. A new sectional hot-water boiler put in in place of an old one removed, and a new hot-water radiator placed in the butler's pantry. The entire exterior of the mansion, including roof balustrades, skylights, ventilators, chimneys, the roof, and the exteriors of the two terraces or wings, were painted. Considerable painting was also done in the interior on attic floor, second floor, and ground floor, and on stairways. A second new water-tight covering placed on roof of east terrace in place of the covering placed there in the autumn of 1906, which proved defective. The furniture in three rooms upholstered, some curtains and draperies purchased, and the walls of one room papered. The exterior of the Executive Office building painted, and some painting done in the interior. Considerable carpentry and painting repairs made in the President's stable, and the walls and ceilings of four living rooms on second floor repapered and the woodwork repainted. Repairs made to the greenhouse structures and to their boilers and heating pipes.

House where Abraham Lincoln died.—The back porch on first floor inclosed with a wood and glass partition and repairs made to carpentry work, plumbing fixtures, and heating apparatus.

Sixth street station building.—The building transferred to the War Department by the Pennsylvania Railroad Company and placed in charge of this Office. The building ordered by the President to be sold at auction for removal. A contract entered into July 9, 1908, for its removal, and the sum of $1,315 received for the old materials contained therein.

Washington National Monument.—New cast-iron sheaves placed at top for cables and new governor gears and shaft put in place on cable drum of elevator. Considerable painting done about shaft,

and a new cement floor placed in motor room. A new tin roof put on lodge house, gas introduced into building, and painting and plumbing repairs made.

Public grounds.—Two additional park spaces, with an aggregate area of 13,477 square feet, added to the park system by transfer from the Commissioners of the District of Columbia. Five unimproved reservations, with an area of 0.457 acre, improved. A macadam roadway 6,350 feet long and 44 feet wide constructed along river side of sections 1 and 2 of Potomac Park, and the ground on either side improved. The improvement of East Potomac Park and the direction of 800 feet of the water-side drive in Monument grounds annex changed to bring it out at Fourteenth street and Maryland avenue. Two thousand and seventy-two feet of cement coping and 11 corner posts constructed around 7 reservations. Over 11,000 square yards of gravel roadway in the President's Park (White Lot) surfaced with broken trap rock. The boathouse at the foot of Seventeenth street NW. transferred to the Chief of Engineers by the Commissioners of the District of Columbia. Garfield Park remodeled by turning abandoned roadways into lawn surfaces and extending walks out to sidewalk lines. The main roadway in the Smithsonian grounds running from Seventh to Twelfth streets resurfaced with asphalt over an area of 4,830 square yards; 663 square yards of new asphalt walk constructed, and 1,310 square yards of old asphalt walk and 140 square yards of asphalt roadway repaired. Six hundred park settees painted and 214 repaired; 1,260 loads of stable manure spread on park lawns. Some of the park lodges and tool houses painted. Eight thousand seven hundred and thirty-seven feet of water pipe and 2,566 feet of drainpipe laid; 2,422 feet of brick gutters and 43 brick catch-basins constructed. Ten additional electric lights and 6 additional gas lamps erected.

Propagating gardens.—The various greenhouse structures repaired and painted as required. The superstructure of one greenhouse and one cold frame reconstructed. Nearly 900,000 plants propagated and 329 trees and 1,060 shrubs planted in parks.

Statues.—The foundations of the memorial to Gen. Ulysses S. Grant nearly completed, the quarter-size model for the bronze artillery group completed, the four bronze lions intended to flank the central pedestal received from the bronze founders and stored. A contract entered into for the Sheridan statue, the equestrian group completed in plaster and sent to the foundry to be cast in bronze. A contract entered into for the construction and erection of the Pulaski statue. Progress made with the models for the von Steuben statue. The full-size model for the Kosciuszko statue completed. A site selected for the John Paul Jones statue and a sculptor chosen to execute the work. A site selected for the statue of Commodore Barry, and a programme of competition prepared and sent to inquiring artists. A site selected for the bronze statue of Longfellow and a contract entered into for the erection of a pedestal for same. An architectural design adopted for the Columbus memorial, and a programme of competition for the sculptural treatment of the memorial prepared and furnished to artists who signified a desire to enter the competition. A design approved for the Stephenson Grand Army memorial, a site selected for same, and a contract entered into for

the erection of a pedestal to receive the memorial. A site selected for the statue of John Witherspoon, for which a pedestal will be provided by the United States.

Departmental telegraph line.—The usual care extended to this line and its overhead wires and underground cable maintained in good working order.

Monument at birthplace of Washington.—The undergrowth removed from the roadway leading from the United States wharf to the monument, the wire fence on either side thereof repaired and the grounds around the monument cleared up, undergrowth removed, and trees trimmed.

Estimates for the fiscal year ending June 30, 1910.

Salaries of employees, public buildings and grounds:		
1 assistant engineer		$3,000
Assistant and chief clerk		2,400
1 clerk of class 4		1,800
1 clerk of class 3		1,600
Clerk and stenographer		1,400
1 messenger		840
Landscape gardener		2,400
Surveyor and draftsman		1,500
Foremen, gardeners, mechanics, and laborers employed in public grounds		31,200
1 sergeant of park watchmen (policemen)		1,100
1 second sergeant of park watchmen (policemen)		1,050
Day watchmen (policemen) in Franklin Park, Lafayette Park, Smithsonian grounds, Judiciary Park, Lincoln Park and adjacent reservations, Iowa Circle, Thomas Circle and neighboring reservations, Washington Circle and neighboring reservations, Du Pont Circle and neighboring reservations, McPherson and Farragut parks, Stanton Park and neighboring reservations, Henry and Seaton parks, Mount Vernon Park and adjacent reservations, greenhouses and nursery, grounds south of Executive Mansion, Garfield Park, Monument Park, Monument Park Annex (Potomac Park), 21 in all, at compensation as follows:		
1 of class 1	$780	
5 of class 2, at $900 each	4,500	
15 of class 3, at $1,000 each	15,000	
		20,280
Night watchmen (policemen) in Smithsonian grounds, Judiciary Park, Henry and Seaton parks, grounds south of Executive Mansion, Monument Park, Monument Park Annex (Potomac Park), Garfield Park, 10 in all, at compensation as follows:		
1 of class 1	$780	
1 of class 2	900	
8 of class 3, at $1,000 each	8,000	
		9,680
Watchman for care of monument and dock at Wakefield, Va., the birthplace of Washington		300
1 day watchman (policeman) and 1 night watchman (policeman) for that part of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the Potomac River, and the tidal reservoir, 2 in all, at compensation as follows:		
1 of class 1	$780	
1 of class 3	1,000	
		1,780

Salaries of employees, public buildings and grounds—Continued.			
1 night watchman (policeman) in that part of Potomac Park between the Virginia channel of the Potomac River, the tidal reservoir, and the sewer canal, at compensation as follows: 1 of class 1		$780	
Night watchmen (policemen) for Stanton and Lincoln parks and 10 adjoining reservations, Lafayette, Franklin, McPherson, and Farragut parks, Washington, Du Pont, Iowa, and Thomas circles, Mount Vernon square, and reservations on Massachusetts avenue from Seventh to Seventeenth streets, 4 in all, at compensation as follows:			
2 of class 1, at $780 each	$1,560		
2 of class 3, at $1,000 each	2,000		
		3,560	
			$84,670
Contingent expenses, public buildings and grounds:			
For contingent and incidental expenses, including purchase of professional and scientific books and periodicals, books of reference, blank books, photographs, and maps		700	
Purchase and repair of bicycles and revolvers for park police and purchase of ammunition		300	
			1,000
Improvement and care of public grounds, District of Columbia:			
Improvement and maintenance of grounds south of Executive Mansion		4,000	
Ordinary care of greenhouses and nursery		2,000	
Extraordinary repairs of greenhouses at the nursery		3,000	
Ordinary care of Lafayette Park		2,000	
Ordinary care of Franklin Park		1,500	
Improvement and ordinary care of Lincoln Park		2,000	
Care and improvement of Monument grounds and annex (Potomac Park) to Monument grounds		7,000	
Improvement, care, and maintenance of Garfield Park		2,500	
Construction and repair of post-and-chain fences, repair of high iron fences, constructing stone coping about reservations; painting watchmen's lodges, iron fences, vases, lamps and lamp-posts; repairing and extending water pipes and apparatus for cleaning them; hose, manure, and hauling the same; removing snow and ice; purchase and repair of seats and tools; trees, tree and plant stakes, labels, lime, whitewashing, and stock for nursery, flower pots, twine, baskets, wire, splints, moss, and lycopodium, to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains, abating nuisances; cleaning statues and repairing pedestals		18,550	
For improvement, care, and maintenance of various reservations, including purchase, maintenance, and driving of horse and vehicle for official use of the officer in charge of public buildings and grounds, and of other necessary vehicles for official use		26,000	
For improvement, care, and maintenance of Smithsonian grounds		3,000	
For improvement, care, and maintenance of Judiciary Park		2,500	
For laying cement and other walks in various reservations		2,000	
For broken-stone road covering for parks		3,500	
For curbing, coping, and flagging for park roads and walks		2,000	
For establishing, fitting up, and maintaining children's playgrounds		3,000	
For care and maintenance of that part of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the Potomac River, and the tidal reservoir		4,000	

Improvement and care of public grounds, etc.—Continued.

For improvement and maintenance of that part of Potomac Park along the north and west sides of the tidal reservoir	$4,000	
For improvement and maintenance of that part of Potomac Park extending along the riverside between the inlet to the tidal reservoir and the foot of Twenty-sixth street NW	3,000	
For continuing improvement of Potomac Park: To complete work of continuing north B street from Virginia avenue westward to the Potomac River as a park roadway along the northern boundary of Potomac Park according to plans prepared in the Office of Public Buildings and Grounds, to be expended under the direction of the officer in charge of that office	25,000	
For continuing the southern half of north B street from Virginia avenue eastward to Sixth street NW. as a park roadway according to plans prepared in the Office of Public Buildings and Grounds, to be expended under the direction of the officer in charge of that office: and the jurisdiction over the portion of north B street required for said roadway now under the control of the Commissioners of the District of Columbia is hereby transferred to the Chief of Engineers, U. S. Army	25,000	
For continuing the improvement of the interior portions of section 1 of Potomac Park, grading, soiling, seeding, planting, laying out walks, etc	15,000	
For improvement of Henry Park, grading, soiling, seeding, laying out walks, etc	15,000	
For constructing two park lodges, one in East Potomac Park and one in West Potomac Park	5,000	
For laying a cement pavement on the sidewalks on the south and west sides of the Treasury Department building	3,000	
		$183,550

Improvement and care of public grounds:

For improvement, care, and maintenance of grounds of Executive Departments	1,000	
For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Library of Congress as may be requested by the superintendent of the Library building	1,000	
For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Capitol and Office Building of the House of Representatives as may be requested by the Superintendent of the Capitol building	3,000	
For improvement and maintenance of Executive Mansion grounds (within iron fence)	4,000	
For the employment of an engineer by the officer in charge of public building and grounds	2,400	
For purchase and repair of machinery and tools for shops at nursery, and for the repair of shops and storehouse	1,000	
		12,400

Repairs, fuel, etc., Executive Mansion:

For ordinary care, repair, and refurnishing of the Executive Mansion, and for the purchase, maintenance, and driving of horses and vehicles for official purposes, to be expended by contract or otherwise, as the President may determine	35,000	
For fuel for the Executive Mansion, greenhouses, and stable	6,000	
For care and maintenance of greenhouses	9,000	
For repairs to greenhouses	3,000	
		53,000

Extraordinary repairs of the Executive Mansion:

For recovering walls, reupholstering and recovering furniture, painting, decorating, purchase of draperies, etc., to be expended by contract or otherwise, as the President may determine		15,000

Lighting, etc., Executive Mansion, etc.:		
For gas, pay of lamplighters, gas fitters, and laborers, purchase, erection, and repair of lamps and lamp-posts; purchase of matches and repairs of all kinds; stoves, fuel, and lights for office and office stable, watchmen's lodges, and for the greenhouses at the nursery: *Provided*, That for each 5-foot burner not connected with a meter in the lamps on the public grounds not more than $18 shall be paid per lamp for gas, including lighting, cleaning, and keeping the lamps in repair under any expenditure provided for in this act, and said lamps shall burn every night on the average from fifteen minutes after sunset to forty-five minutes before sunrise, and authority is hereby given to substitute other illuminating material for the same or less price and to use so much of the sum hereby appropriated as may be necessary for that purpose: *Provided further*, That $4,200 of the foregoing sum shall be paid from the revenues of the District of Columbia and the remainder from the Treasury of the United States: *And provided further*, That not more than $6,000 of said appropriation may be expended for lighting, extinguishing, cleaning, repairing, and painting park lamps of a higher candlepower than those provided for above and not less than 60 candlepower, which lamps shall cost not to exceed $20.85 per lamp per annum, and shall otherwise be subject to the restrictions of this paragraph	$19,500	
For lighting 6 arc electric lights in the Executive Mansion grounds within the iron fence, at not exceeding $85 per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights	510	
For lighting 6 arc electric lights at the propagating gardens, at not exceeding $85 per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights	510	
		$20,520
Lighting public grounds, District of Columbia:		
For lighting, arc electric lights in the public grounds, as follows: For 7 in the grounds south of the Executive Mansion; 32 in Lafayette, Franklin, Judiciary, and Lincoln parks; 14 in grounds south of the Executive Mansion and in Monument Park, and 27 in Potomac Park driveway, at not exceeding $85 per light per annum, which sum shall cover the entire cost of lighting and maintaining, in good order each of said lights, in all	6,800	
For laying conduit, erecting 40 poles and lamps, and lighting same, on macadam roadways in sections 1 and 2 of Potomac Park, at not exceeding $85 per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights	3,400	
		10,200
Telegraph to connect the Capitol with the Department and Government Printing Office:		
For care and repair of existing lines	1,500	
For purchasing and installing cables in underground conduits already in place and for taking down and removing the present system of overhead wires and poles	3,000	
		4,500
		299,170

Care and maintenance of Washington Monument:		
For the care and maintenance of the Washington Monument, namely:		
1 custodian, at $100 per month	1,200	
1 steam engineer, at $80 per month	960	
1 assistant steam engineer, at $70 per month	840	
1 fireman, at $55 per month	660	
1 assistant fireman, at $55 per month	660	
1 conductor of elevator car, at $75 per month	900	
1 attendant on floor, at $60 per month	720	
1 attendant on top floor, at $60 per month	720	
3 night and day watchmen, at $60 per month	2,160	
		8,820
For fuel, lights, oil, waste, packing, tools, matches, paints, brushes, brooms, lanterns, rope, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors, repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the Monument and machinery, and purchase of all necessary articles for keeping the Monument, machinery, elevator, and electric plant in good order: *Provided*, That no advertisement of any kind shall be displayed nor shall articles of any kind be sold in or around the Monument		3,000
		11,820
Repairs to building where Abraham Lincoln died:		
For painting and miscellaneous repairs		200
Improvements, birthplace of Washington, Wakefield, Va.:		
For repairs to fences and cleaning up and maintaining grounds around the monument	$100	
For repairs to wharf damaged by storms of February, 1897, and February, 1905	7,000	
		7,100

As some of the preceding estimates are larger than amounts heretofore appropriated, and as some of them are new, the following explanations thereof are submitted:

1. I have asked for an increase in the pay of the assistant engineer from $2,400 to $3,000 per annum. The present compensation of the gentleman who occupies this position is not an adequate one for his duties and responsibilities. He superintends the work performed by the large force of foremen, mechanics, and laborers employed in care of the parks and in the prosecution of new work. He is charged with the preparation of estimates and specifications for new work and consultation of plans for same. He is in charge of the force of mechanics and laborers at the White House and supervises the work for the repair, betterment, and refurnishing of that building. He also exercises supervision over the force employed at the Washington Monument and the work of repairs and improvement there. He supervises the work of erecting statues and also makes monthly inspections of the buildings, twelve in number, occupied as offices by the War Department, other than the State, War, and Navy Departments building, so far as their preservation, care, and safety are concerned. His experience with workmen and his knowledge of the amount of work they should perform results in the work being done in a better and more economical manner than would be the case with a man of less ability and experience, and this, of course, means a saving to the Government. There is no doubt but that a private firm or a corporation would pay more than $3,000 per annum to an employee of his capability and having his responsibilities. In fact, he

has been offered that salary by a private concern, and there seems to be no good reason why the Government should pay less.

2. I have asked for an increase of $150 per annum in the pay of the first and second sergeants of park police. The duties of these officers are as exacting and onerous as those performed by the sergeants of Metropolitan police, while the pay of the latter is $1,250 per annum.

3. I have asked for an increase in the pay of the park policemen and the establishment of three grades, viz, those who have served less than three years to receive $780 per annum, those who have served over three years and less than five years to receive $900 per annum, and those who have served over five years to receive $1,000 per annum.

The Washington park policeman is probably the poorest paid man in the United States who has police duty to perform. He has practically the same duties as the Metropolitan police. The same intelligence and physical qualifications are required of him. His moral character must be good; his discipline is much the same. He has as many arrests to make as the average policeman. He runs the same risks as to injury from vicious people as the man doing duty on the street. His duties are more exacting, as half of his duty hours are spent in cautioning people about violating the rules of the park and in looking after children. He has a uniform to buy once a year in order to look neat, yet the pay of these policemen is only $60 per month. The city government requires the street-railway companies to pay their crossing police officers $75 per month for a great deal less exacting and laborious duty. The lowest grade on the Metropolitan police force receive $75 per month; the officers who serve three years faithfully receive $90 per month, while those who have served five years receive $100 per month. For these reasons the increase in pay asked is strongly recommended. It is also recommended that the designation of these employees be changed from park watchman to park policeman, as the latter designation indicates more clearly the duties they perform.

4. The estimate for contingent expenses has been submitted in two items, following the appropriation act for 1909. It is recommended, however, that the two items be consolidated into one with a lump sum of $1,000. This will allow the appropriation to be used indiscriminately for either of the items where most needed.

5. I have asked for the sum of $3,000 for "extraordinary repairs to greenhouses at the nursery." There are 28 greenhouses, 3 greenhouse pits, and 8 cold frames at the nursery, and the annual appropriation allowed for their repair and maintenance is but $2,000. One of the houses is in a very dilapidated condition and practically useless; another of the houses and a greenhouse pit adjoining are liable to collapse at the first snowstorm. Three of the houses are in need of extensive repairs and their boilers and pipes are also in bad condition. It is recommended that the additional appropriation may be granted in order that the repairs enumerated and others may be made.

6. I have asked for $26,000 for improvement, care, and maintenance of various reservations instead of the $25,000 granted annually for some years. Each year the Commissioners of the District of Columbia transfer, under existing law, to the Chief of Engineers street spaces which have been devoted by them to park purposes and it is the desire of this office to improve these spaces as soon as they come

into our charge. Applications are also received from citizens for the improvement of unimproved spaces in order that they may be in harmony with private improvements in the vicinity. The additional sum requested, if granted annually, will permit of the improvement of some of these small spaces each year.

7. The sum of $3,000 is asked for establishing and caring for and maintaining children's playgrounds on public reservations. By existing legislation the officer in charge of public buildings and grounds is authorized to grant the use of the public grounds for children's playgrounds, but it is respectfully submitted that permission to use the grounds for that purpose is not sufficient. An appropriation should be made for fitting them up, and every year the necessary appropriations should be made for their care, extension, and renewals as apparatus is worn out and broken. It is believed that there is no other way in which a small amount of money can be expended which would do more good, give greater pleasure, or result in more lasting benefit than money appropriated and expended for fitting up, caring for, and maintaining children's playgrounds.

8. In sundry civil act for the fiscal year ending June 30, 1909, Congress appropriated the sum of $70,000 to "continue North B street from Virginia avenue westward to the Potomac River as a park roadway along the northern boundary of Potomac Park and for the acquisition of squares 63 and 89." As this amount was much less than the estimate submitted by this office, and is not sufficient for the work, I have submitted an estimate of $25,000 to complete the improvement.

9. In addition to the preceding item I have submitted an estimate of $25,000 for continuing the southern part of North B street as a park roadway from Virginia avenue eastward to Sixth street NW. This, in connection with the roadway already authorized west of Virginia avenue will give a continuous park roadway on the line of B street north, from the Potomac River to Sixth street.

10. I have asked for an appropriation of $15,000 to commence the work of improving the interior portions of section 1 of Potomac Park, being the large section between the drainage canal and the north boundary of the park. This section is now being filled with materials dredged from the Potomac River by the officer in charge of the improvement of the river, and by the first of July, 1909, the area will be in condition for its improvement. It is the intention to grade the ground, cover it with soil, seed it down, lay out walks, and plant trees and shrubs.

11. I recommend an appropriation of $15,000 for grading, soiling, seeding, planting, and constructing walks in Henry Park. As stated elsewhere in this report, the old station building at Sixth street in this park is to be torn down and removed by order of the President. When this is done the area which has been occupied for many years by it and by the train shed, tracks, and concrete platforms of the Pennsylvania Railroad should be improved as indicated, in order that it may conform to other portions of the park. Much grading is to be done, and the old bridge across Sixth street which connected the carriage roads in Henry and Seaton parks across the railroad tracks must also come down, as it is in an unsafe condition. It is hoped that this appropriation may be granted.

12. I have asked for the sum of $5,000 for the erection of two park lodges, one in East Potomac Park and one in West Potomac Park, for use as watchmen's lodges, tool houses, and convenience stations. There are now no facilities in either of those parks for the storage of tools, and much time is lost by the workmen in going to and from the storehouse at Fifteenth and C streets SW., where the tools have been kept over night. They will also furnish shelter for the park watchmen in inclement weather.

13. I have asked for an appropriation of $3,000 for a cement pavement on the sidewalks on the south and west sides of the Treasury Department building. There is at present an old stone flag pavement there, which is in bad condition, and it should be replaced with a new pavement.

14. I have asked for $15,000 for "Extraordinary Repairs of the Executive Mansion." The walls of the Red, Blue, and Green rooms require new coverings, and the woodwork, etc., in those rooms and in the East Room need repainting. The furniture in these apartments and in other parts of the mansion should be reupholstered and recovered, and new window and door draperies are needed. The usual annual appropriation of $35,000 is barely sufficient for the ordinary needs of the mansion, and an additional appropriation should be made for the fiscal year commencing July 1, 1909, for the work mentioned.

15. I have asked for an appropriation of $3,400 for 40 electric lights for the waterside drives in sections 1 and 2 of Potomac Park. Those driveways are not now lighted, and lights should be provided for them, as has already been done for the Seventeenth street driveway and the driveways in East Potomac Park.

16. I have asked for the sum of $3,000 for purchasing cables and installing them in underground conduits for the use of the departmental telegraph line. The Western Union Telegraph Company has just completed the laying of conduits along E street, from Fourteenth street to North Capitol street, and under the law is obliged to give the United States the use of one of them for its wires. The amount requested will be used in purchasing and installing cables in the conduit, introducing them into the several departmental buildings, the Capitol, and the Government Printing Office, and in taking down and removing the poles and overhead wires of the present system. When this is done the entire departmental telegraph line will be underground.

17. The amount appropriated for the fiscal year 1908 for repairing fences and cleaning up and maintaining the grounds around the monument at the birthplace of Washington was $500. Of this about $363 has been expended in the work, leaving a balance of $137 to be returned to the Treasury. An appropriation of $100 should be made annually for this work, and an estimate for that amount is submitted for the fiscal year ending June 30, 1910.

18. An estimate of $7,000 for the repair of the United States wharf at Wakefield, Va., the birthplace of Washington, is submitted and recommended.

The wharf is an iron-pile wharf, with timber deck, and was badly damaged by a severe storm and ice jam in February, 1897. An estimate for its repair was submitted last year. In the present estimate the amount is increased by $3,000, as additional damage was caused

to the wharf by ice in February, 1905, as mentioned elsewhere in this report. In its present condition it is useless for the purpose for which it was built, viz, as a landing for steamers carrying visitors to the monument at the birthplace.

Financial statement for fiscal year ending June 30, 1908.

Title of appropriation.	Available at beginning of fiscal year.	Expended during fiscal year.	Pledged by contract.	Unexpended balance to revert to Treasury.
Improvement and care of public grounds, District of Columbia, 1908	$167,550.00	$163,981.61	.....	$3,568.39
Improvement and care of public grounds, 1908	12,400.00	11,779.87	.....	620.13
Repairs, fuel, etc., Executive Mansion, 1908	53,000.00	52,886.23	.....	113.77
Lighting, etc., Executive Mansion, etc., 1908	20,520.00	18,110.59	.....	2,409.41
Lighting public grounds, District of Columbia, 1908	6,800.00	5,900.92	.....	899.08
Telegraph to connect the Capitol with the Departments and the Government Printing Office, 1908	1,500.00	1,490.33	.....	9.67
Contingent expenses public buildings and grounds, 1908	700.00	683.01	.....	16.99
Salaries of employees public buildings and grounds, 1908	74,150.00	74,038.43	.....	111.57
Care and maintenance of the Washington Monument, 1908	11,820.00	11,782.04	.....	37.96
Repair of building where Abraham Lincoln died, 1908	200.00	139.58	.....	60.42
Improvement and care of public grounds, District of Columbia, 1907-8	2,715.36	2,715.36	.....	.....
Equestrian statue of General Wm. T. Sherman	517.66	.....	.....	517.66
Pedestal for statue of General Philip H. Sheridan	49,980.17	6,065.75	$43,500.00	.....
Memorial to General Ulysses S. Grant	80,100.00	15,599.88	64,500.12	.....
Statue of Brig. Gen. Count Pulaski	47,514.78	4,019.67	35,000.00	.....
Statue of General Baron von Steuben	45,277.76	5,800.00	37,000.00	.....
Statue of Thomas Jefferson	5,000.00	.....	.....	.....
Statue of John Paul Jones	50,000.00	.....	.....	.....
Statue of Commodore John Barry	50,000.00	.....	.....	.....
Pedestal for statue of Henry Wadsworth Longfellow	4,000.00	.....	4,000.00	.....
Memorial to Christopher Columbus	100,000.00	.....	.....	.....
Improvements birthplace of Washington, Wakefield, Va., 1908	500.00	364.29	.....	135.71
Site and pedestal Stephenson Grand Army memorial	10,000.00	.....	.....	.....
Pedestal for statue of John Witherspoon	4,000.00	.....	10,000.00	.....

I desire to express my appreciation of the faithful services rendered during the past year by the entire force under this office.

I am, General,

Very respectfully, your obedient servant,

CHAS. S. BROMWELL,
Colonel, U. S. Army, Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

APPENDIX A.

Inventory of public property, Executive Mansion, June 30, 1908.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
THIRD FLOOR.					
Attic.					
Awnings					
Bed, iron					
Mattress, hair					
Racks, towel, oak					
Commodes, oak					
Corner seats					
Bookcase, revolving					
Bookcase, mahogany					
Stands, umbrella, walnut					
Chairs, side, mahogany					
Screen, fire, brass					
Table, walnut, breakfast					
Awnings, window, canvas					
Awnings for receptions					
Awnings for large bow windows					
Fenders for radiators in vestibule					
Boxes, wooden					
Flags, post					
Flags, storm					
Boxes, pine, with locks, to store curtains					
Chairs, camp, wooden					
Tables, round, oak					
Axes					
Hose, canvas					
Table, wicker, round					
Chairs, wicker, arm					
Chairs, wicker, rocking					
Settees, wicker					
Curtains, tapestry (17 yards)					
Mirrors					
Rug, Smyrna					
Washstands					
Chairs					
Chairs, rocking					
Tubs, foot					
Toilet sets					
Clocks					
Spring, woven-wire					
Washstand, maple, marble top					
Tables, small, ebonized					
Rack, towel, ash					
Chair, wicker					
Cushion, chair					
Carpet ... yards					
Bureau, walnut					
Couch, walnut, upholstered					
Desk, writing, walnut					
Chiffoniers, oak					
Figures, bronze, female					
Footbath, tin					
Chair, rocking, cherry, cane seat					
Scarf, table, plush, dark green					
Bowl, wash, china, thick					
Pitcher, china, thick					
Shade, white, Holland					
Shade, green, Holland					
Beds, single, iron					
Springs, single					
Pillows, feather					
Bureau, rosewood, marble top					
Chiffonier, walnut					
Stand, wash, cherry, marble top					
Table, lacquered					

APPENDIX A.

Inventory of public property, Executive Mansion, June 30, 1908.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908. June 30	5	Good.
		5		5				do	4	Do.
		4		4				do	10	Do.
		10		10				do	3	Do.
		3		3				do	1	Do.
		1		1				do	2	Do.
		2		2				do	1	Do.
		1		1				do	1	Do.
		1		1				do	2	Do.
		2		2				do	0	
		2		2	2	Broken; worthless	The President	do	1	Do.
		1		1				do	1	Do.
		1		1				do	0	
		21		21	21	Worn-out; worthless.	The President	do	2	Do.
		2		2				do	1	Do.
		1		1				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	1	Do.
		1		1				do	6	Do.
		6		6				do	50	Do.
		50		50				do	8	Do.
		8		8				do	2	Do.
		2		2				do	1	Do.
		1		1				do	1	Do.
		1		1				do	5	Do.
		5		5				do	4	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		4		4				do	2	Do.
		2		2				do	1	Do.
		1		1				do	3	Do.
		3		3				do	6	Do.
		6		6				do	4	Do.
		4		4				do	1	Do.
		1		1				do	4	Do.
		4		4				do	2	Do.
		2		2				do	1	Do.
		1		1				do	1	Do.
		1		1				do	2	Do.
		2		2				do	1	Do.
				1				do	1	Do.
				1				do	1	Do.
				1				do	69	Worn.
		128		128	59	Worn-out; worthless.	The President	do	1	Good.
		1		1				do	1	Do
		1		1				do	1	Do.
		1		1				do	2	Do.
		2		2				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Broken.
		1		1				do	1	Good.
				1				do	1	Do.
				1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	15	Do.
		15		15				do	1	Do.
				1				do	1	Do.
				1				do	1	Do.
				1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
THIRD FLOOR—continued.					
Attic—Continued.					
Chairs, side, rosewood, upholstered					
Chair, side, cherry, cane seat					
Chair, side, ebonized, upholstered					
Bookcase, pine					
Clock, black marble					
Basket, waste, wooden					
Toilet set, 5 pieces, odd					
Foot rests, mahogany, upholstered in leather.					
Tray, silver-plated					
Pillows, sofa, covered with satin damask					
Chairs, mahogany, seats upholstered in leather.					
Covers, loose canton flannel					
Chairs, band					
Chairs, gilt					
Dresser, golden oak					
Cushions, felt, for gilt chairs					
Rugs, made from carpet					
Chairs, bent wood, gilded					
Covers, loose, for gilded chairs					
Shades, window					
Toilet set, china, 8 pieces					
Towel rack					
Refrigerator, nursery					
Cabinets, ebonized					
Stands, flower, wood, ebonized					
Rugs, made from carpet					
Rocker, mahogany, high back					
Extinguishers, fire, nickel plated					
Buckets, fire, galvanized					
Hooks, fire, 6-foot					
Matting, white ... yards					
Chairs, golden oak, wooden seats, for use of band.					
Attic bathroom.					
Stand, towel					
Linen room, attic.					
Mats, bath					
Shams, linen ... pair					
Do ... pairs					
Spreads, bed					
Do					
Sheets, linen ... pairs					
Do ... do					
Towels, linen					
Do					
Towels, pot					
SECOND FLOOR.					
Northwest bed or dressing room.					
Shades, window, green, Holland					
Carpet, Wilton ... yards					
Seat, window, upholstered in blue					
Commode, mahogany					
Chair, rocking, with cushion, mahogany					
Chair, mahogany, side					
Desk, mahogany					
Bureau, mahogany					
Chiffonier, mahogany					
Table, mahogany, invalid's					
Chair, arm, upholstered in blue					
Fireboard, brass					
Laces, muslin ... pairs					
Mirror, mahogany, small					
Chair, side, walnut					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		2		2				June 30	2	Good.
		1		1	1	Broken; worthless	The President	do	0	
		1		1	1	Sold at auction	do	do	0	
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		10		10				do	10	Do.
		250		250				do	250	Do.
		60		60	4	Broken; worthless	The President	do	56	Do.
		150		150				do	150	Do.
		1		1				do	1	Do.
		100		100				do	100	Do.
		2		2				do	2	Do.
		150		150				do	150	Do.
		150		150				do	150	Do.
		16		16				do	16	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		465		465				do	465	Do.
		36		36				do	36	Do.
		1		1				June 30	1	Good.
		5		5				June 30	5	Good.
		1		1				do	1	Do.
		2		2				do	2	Do.
		12		12				do	12	Do.
		6		6				do	6	Do.
		7		7				do	7	Do.
		2		2				do	2	Do.
		72		72				do	72	Do.
		12		12				do	12	Do.
		48		48	48	Worthless	The President	do	0	
		5		5				June 30	5	Good.
		74		74				do	74	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
				1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Northwest bed or dressing room—Cont'd.					
Foot tub, tin					
Mug, toothbrush					
Curtains, cretonne ... pairs					
Curtains, muslin ... do	2	July 29, 1907	$8.10	$16.20	W. B. Moses & Sons (Incorporated).
Northwest bathroom.					
Seat, bath					
Carpet, Wilton, velvet ... yards					
Curtains, window, white, Holland					
Northwest bedroom.					
Shades, window, green, Holland					
Desk, mahogany					
Bedsteads, brass					
Springs, woven wire					
Mattresses, hair, 2 pieces each					
Couch, upholstered in blue					
Chair, corner					
Seat, window					
Cushions, for rockers					
Hassocks					
Screen, 3-fold satin damask					
Wardrobe, walnut					
Wardrobe, mahogany					
Chairs, rocking, painted white					
Chair, rocking, mahogany					
Table, mahogany					
Stands, mahogany					
Table, painted					
Chiffonier, mahogany					
Dresser, rosewood					
Chairs, side, mahogany					
Fender, brass					
Fender, wire, spark					
Fire tools, brass, complete ... set					
Andirons, brass					
Fireboard, brass					
Clock, black marble					
Laces ... pairs					
Basket, wooden, waste paper					
Pillows, sofa, blue satin damask					
Bookcase, mahogany					
Quilt, bed					
Curtains, sash ... pair					
Awnings, window					
Screen, 3-fold, mahogany					
Rug, carpet, Wilton, solid green ... yards					
Screen					
Chair, arm, upholstered in blue					
Curtains, for windows, old material interlined with old flannel, lined with new satinet, trimmed with fringe, gimp cord, tassel loops and center tassels, new rods and fixtures, pairs.					
Slip covers, chintz					
Chair, rocking					
Lamp, electric					
Curtains, muslin ... pairs	2	July 29, 1907		16.20	W. B. Moses & Sons (Incorporated).
Comfort, bed, silk	1	Feb. 13, 1908		10.00	Woodward & Lothrop.
Curtains, muslin, sash	6	Mar. 21, 1908	1.33	8.00	W. B. Moses & Sons (Incorporated).
Sewing room.					
Curtains, muslin ... pair	1	July 29, 1907		8.10	W. B. Moses & Sons (Incorporated).

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		2		2				do	2	Do.
90	Sept. 30, 1908		2	2				do	2	Do
		1		1				June 30	1	Good.
		4½		4½				do	4½	Do.
		2		2				do	2	Do.
		4		4				June 30	4	Good.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		96¾		96¾				do	96¾	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		5		5				do	5	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
90	Sept. 30, 1907	4	2	6				do	6	Do.
69	Mar. 30, 1908		1	1				do	1	Do.
54	May 2, 1908		6	6				do	6	Do.
90	Sept. 30, 1907		1	1				June 30	1	Good.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Bedroom, west of alcove hall, north side.					
Cabinet, china					
Carpet, blue, Brussels.....yards					
Laces, renaissance.....pair					
Curtains, heavy blue satin damask.pairs					
Bedsteads, iron and brass					
Springs for above					
Mattresses, hair					
Pillows, feather					
Bureau, painted white					
Do					
Washstand, painted white					
Wardrobe, rosewood, painted white					
Table, rosewood, marble top, painted white.					
Chiffonier, walnut, painted white					
Desk, walnut, painted white					
Table, lacquered, painted white					
Couch, upholstered in blue damask					
Chair, Turkish, upholstered in blue damask.					
Chair, arm, upholstered in blue damask					
Chairs, side, upholstered in blue damask					
Seat, window, upholstered in blue damask					
Pillows, sofa, upholstered in blue damask					
Quilt, silk					
Basket, wooden, waste paper					
Candlesticks, china					
Vases, china, decorated in blue					
Vase, flower, dark green					
Toilet set, Japanese, 6 pieces					
Clock, brass, and glass					
Match safe, Wedgwood, blue					
Mirror, gold frame					
Andirons, brass.....pair					
Fender, brass					
Fire tools, complete.....set					
Vase, flower, glass					
Chair, rocking, cherry					
Hassock					
Lamp					
Shade, silk					
Table, walnut, painted white, marble top					
Quilts, bed					
Screen					
Screen, Japanese					
Hamper, clothes					
Wardrobe, rosewood, plate-glass door (mirror).					
Shade, window, green					
Curtains, cretonne.....pair					
Hamper					
Towel rack					
Dresser, rosewood, painted white					
Curtains, window, muslin.....pair	1	July 29, 1907		$8.10	W. B. Moses & Sons (Incorporated).
Comfort, bed.....do	1	Nov. 8, 1907		6.00	Woodward & Lothrop.
Alcove hall.					
Curtains, Brussels lace.....pair					
Curtains, muslin.....do	1	July 29, 1907		8.10	W. B. Moses & Sons (Incorporated).
Bedroom, east of alcove hall, north side.					
Shade, window, green					
Table					
Carpet, Brussels.....yards					
Laces, Brussels.....pair					
Beds, brass, 3 feet 6 inches wide					
Springs					
Mattresses, hair					
Pillows, feather					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		77½		77½				do	77½	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
90	Sept. 30, 1907		1					do		Do.
69	Mar. 30, 1908		1					do		Do.
		1		1				June 30	1	Good.
90	Sept. 30, 1907		1	1				do	1	
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		74¾		74¾				do	74¾	Do.
		1		1				do	1	Do
		2		2				do	2	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Bedroom, east of alcove hall, north side—Continued.					
Quilts, silk					
Bureau					
Chair, Turkish, upholstered					
Chair, side, upholstered					
Couch					
Clock, black marble					
Vases, bronze					
Vases, bronze, small					
Fire tools, brass, complete.....set					
Basket, iron, grate					
Bottles, cut-glass					
Basket, wooden, waste					
Seat, window, upholstered in pink satin damask.					
Pillow, sofa, covered with satin damask					
Statuettes					
Picture, Christ in the Temple					
Picture, Madonna					
Picture, Madonna at organ					
Chair, maple, rocking, with cushion					
Slip covers					
Rug, carpet, Wilton, red, white figure, yards.					
Wardrobe, mahogany					
Table, maple					
Curtains, cretonne.....pair					
Chair, rocking					
Comforts, bed	2	Oct. 14, 1907	$2.00	$4.00	Woodward & Lothrop.
Large northeast bedroom.					
Curtains, window, muslin					
Covers, table, plush					
Splasher, washstand					
Shades, window, green					
Rocker, white					
Bedstead, mahogany, canopy draped					
Table, mahogany, toilet					
Mirror, mahogany, gilt					
Mirror, mahogany, cheval glass					
Wardrobe, mahogany					
Table, mahogany, writing					
Table, mahogany, night					
Table, mahogany, round					
Bureau, mahogany, chest of drawers					
Washstand, mahogany					
Carpet					
Curtains, white-ground material, lined, pairs.					
Awning					
Baskets, waste					
Cover, bed, pique					
Bed drapery, muslin	1	Oct. 18, 1907		25.00	W. B. Moses & Sons (Incorporated).
Small northeast bedroom.					
Curtains, window, muslin					
Shades, window, green					
Bedstead, 4-0 brass					
Bed spring, upholstered					
Mattress					
Bureau, painted					
Table, writing, painted					
Table, night, painted					
Chairs, painted, light					
Carpet					
Curtains, cretonne.....pairs					
Awnings					
Rocker					
Cover, bed, pique					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		2		2				June 30	2	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		10		10				do	10	Do.
		115		115				do	115	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
19	Nov. 19, 1907		2	2				do	2	Do.
		4		4				June 30	4	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
70	Mar. 30, 1907		1	1				do	1	Do.
		2		2				June 30	2	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Small southeast bedroom.					
Curtains, window, muslin					
Shades, window, green					
Comfort, down					
Bed, 4-0 brass					
Bed spring, upholstered					
Mattress, hair					
Bureau, painted green and white					
Table, writing, painted green and white					
Table, night, painted green and white					
Chairs, painted green and white in cotton					
Carpet					
Curtains, rose armure ... pairs					
Basket, scrap					
Scarfs, bureau					
Large southeast bedroom.					
Curtains, window, muslin					
Covers, table, plush					
Splasher, washstand					
Shades, window					
Comfort, down					
Couch, upholstered in blue					
Chair, rocker, white					
Bedstead, mahogany, canopy					
Bed spring, upholstered					
Mattress					
Table, mahogany, toilet					
Mirror, gilt, toilet, colonial					
Mirror, mahogany, cheval glass					
Wardrobe, mahogany					
Table, mahogany, writing					
Table, mahogany, night					
Table, mahogany, round					
Bureau, mahogany, chest of drawers					
Sofa, in cotton					
Washstand, mahogany					
Carpet					
Curtains, white-ground material, lined, complete, pairs.					
Hamper, clothes					
Chair, rocker, mahogany finish					
Basket, scrap					
Bureau scarfs ... sets					
Baskets, waste					
Shade, lamp	1	Jan. 3, 1908		$1.50	C. A. Muddiman & Co.
Bed drapery, muslin	1	Oct. 18, 1908		25	W. B. Moses & Sons (Incorporated).
Library, south side.					
Silk, china ... yards					
Cover, desk					
Mat, lamp					
Curtains, heavy satin damask ... pairs					
Bookcases, walnut, small					
Bookcase, revolving					
Table, rosewood, inlaid and carved					
Sofas, upholstered, wool tapestry					
Lounge, upholstered, wool tapestry					
Chairs, Turkish, wool tapestry					
Chairs, side, wool tapestry					
Chair, arm, straight back					
Chair, arm, rosewood, upholstered					
Chair, arm, overstuffed					
Medallion, in frame					
Piano, Bradbury grand					
Bronze bust, George Washington					
Vases, bronze					
Figures, bronze women					
Clock, black marble, with bronze top					
Candelabrum, brass, 3 lights					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		4		4				June 30	4	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				June 30	2	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
53	Apr. —, 1908		1	1				do	1	Do.
70	Mar. 30, 1908		1	1				do	1	Do.
		19½		19½				June 30	19½	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Library, south side—Continued.					
Vase, china, decorated in blue and gold					
Stool, piano, revolving					
Fire tools, brass, complete.....set					
Andirons, brass, complete.....pair					
Cuspidors, brass					
Piano cover, green plush					
Mat, table, green plush					
Painting, oil, John Hampden					
Water color, statue, Daniel Webster					
Lamp					
Shade, lamp, umbrella					
Water color, marine scene					
Water color, marine scene					
Pillows, plush					
Pole, curtain, brass, with rings and brackets.					
Table, tea, mahogany					
Screen					
Lamp					
Globe, lamp					
Tables, side, high, marble top					
Chairs, mahogany, solid wood backs					
Covers, loose, cotton damask					
Rug, Scotch woven, oval shape					
Kidney desk, mahogany					
Shade, lamp					
Shade					
Lamp					
Curtains, renaissance lace.....pairs					
Table, tea, mahogany					
Room west of library.					
Bedstead, youth's single					
Chairs, arm, upholstered in satin					
Chairs, arm, upholstered in damask					
Couch, upholstered in satin damask					
Chair, rocker, cherry, with cushion					
Screen, 3-fold, cherry, stained					
Desk, mahogany					
Bureau, rosewood					
Dresser, rosewood					
Wardrobe, walnut					
Washstand, walnut					
Andirons, brass.....pair					
Fire tools, brass, complete.....set					
Fender, brass					
Basket, wooden, waste paper					
Candlestick, brass and glass.....pair					
Statuettes, fisherman and fisherwoman, pair.					
Clock, brass and glass					
Vases, flower, Japanese					
Vases, white and gold; scenes from the desert.					
Vases, red and gold					
Match safe, brass					
Stand, ebony					
Slip covers					
Chair, rocking, mahogany, high back					
Chair, rocking, mahogany, low					
Cushion					
Mattress, hair					
Cabinet, china					
Shades, window, green					
Curtains, heavy, red satin damask					
Shades, white, Holland					

***Inventory of public property, Executive Mansion, June 30, 1908*—Continued.**

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		1		1				June 30	1	Good.
		3		3				do	3	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
								do	1	Do.
								do	1	Do.
								do	1	Do.
								do	1	Do.
								do	1	Do.
								do	1	Do.
								do	1	Do.
		2		2				do	1	Do.
		1		1						Do.
		2						do	2	Do.
								do	1	Do.
		1						do	1	Do.
		10		10				do	10	Do.
								do	1	Do.
		2						do	2	Do.
		1						do	1	Do.
		1						do	1	Do.
		1						do	1	Do.
		2						do	2	Do.
		2						do	2	Do.
		2						do	2	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Southwest bedroom.					
Mattress, hair					
Bolster					
Curtains, heavy light-green satin damask, pairs.					
Laces, renaissance ..... pairs					
Beds, brass, ¾					
Mattress, hair					
Pillows, feather					
Springs					
Glass, pier, mahogany					
Washstand, walnut, marble top, high back.					
Wardrobe, mahogany					
Dresser, walnut, marble top					
Dresser, mahogany, marble top					
Lounge, upholstered					
Chairs, arm, upholstered					
Chair, arm, upholstered, high back					
Chairs, side, upholstered					
Seats, window					
Pillows, sofa					
Table, walnut, marble top					
Table, round, mahogany					
Toilet set, 7 pieces					
Fender, brass					
Andirons, brass					
Fire set, brass, complete					
Basket, brass, waste					
Clock, black marble					
Ornaments, black marble, to accompany clock.					
Vases, flower					
Photograph, President Arthur, in gilt frame.					
Engraving, in gilt frame					
Table, lacquered					
Vases, flower, cut glass					
Vase, flower					
Mirror, brass, oval, easel back					
Lamp					
Carpet, Wilton velvet ..... yards					
Covers, bureau					
Cover, dressing case					
Cover, side table					
Cover, table, plush					
Shams, pillow					
Quilt, bed					
Bed, brass					
Spring, box					
Pillow, hair					
Pad, desk					
Rack, pen					
Inkstand					
Screen					
Basket, waste					
Scarf, bureau					
Supporters, book ..... pairs					
Blankets, Roman					
Awnings, window					
Covers, loose					
Basket, waste, wooden					
Curtains, window, French swiss. pairs					
Curtains, bed (for making) ..... do					
Fender, brass					
Fire tools, brass, complete ..... set					
Bed, double, rosewood, carved					
Mattresses, hair					
Pillows, feather					
Canopy, gilt, over bed					
Silk, blue moire ..... yards					
Fringe, velvet ..... do					
Velvet, for rug ..... do					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		4		4				do	4	Do.
		2		2				do	2	Old.
		2		2				do	2	Good.
		5		5				do	5	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		8		8				do	8	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		121		121				do	121	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		12		12				do	12	Do.
		50		50				do	50	Do.
		58		58				do	58	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Southwest bedroom—Continued.					
Carpet, border, velvet, for rug...yards..					
Damask, silk.....do....					
Damask, silk.....do....					
Interlining for draperies, etc.....do....					
Sofa, in cotton					
Curtains, for windows, cream ground silk, lined with satinet, interlined with flannel, front and bottom ornamented with gimp, cord loops, with slides, center tassel, pairs.					
Covers, mattress, pique					
Slip covers, chintz					
Blankets.....pair..					
Curtains, window, muslin, white fringe, pairs.					
Drapery, bed					
Curtains, muslin.....pairs..	2	July 29, 1908		$16.20	W. B. Moses & Sons (Incorporated).
Curtains, window, striped damask, lined and interlined, pairs.	2	Apr. 22, 1908		153.33	.....do.....
Drapery, bed, striped damask	1	.....do.....		93.90	.....do.....
Southwest dressing room.					
Rug, Wilton, green					
Sofa, upholstered					
Chair, arm, upholstered					
Chairs, side, upholstered					
Seat, window, upholstered					
Pillows, sofa					
Bureau, rosewood					
Desk, writing, inlaid					
Basket, wooden, waste paper					
Fender, fire, brass					
Fire tools, brass, complete.....set..					
Basket, grate, iron					
Sideboard top, oak					
Figure, bronze, storks					
Figure, bronze, pheasants					
Vases, flower					
Candlesticks, brass					
Statuette, bisque					
Match safe, brass					
Mattresses, hair					
Pillows, feather					
Dish, soap, silver plated					
Chair, walnut, cane					
Laces, renaissance					
Screen, 4-fold, black					
Awnings, window					
Rugs, oriental					
Chiffonier, walnut					
Stand, shaving, mahogany					
Rack, towel, walnut					
Chairs, side, walnut, cane seat					
Wardrobe, walnut					
Hamper, clothes					
Shade, white, Holland					
Shades, green					
Curtains, window, French Swiss..pairs..					
Bottles, cut glass					
Curtains, cretonne.....pairs..					
Curtains, muslin.....do....	2	July 29, 1907		16.20	W. B. Moses & Sons (Incorporated).
Southwest bathroom.					
Curtains, sash.....pairs..					
Oil heater	1	Dec. 31, 1907		4.00	Geo. F. Muth & Co...
Curtains, window, striped damask lined and interlined, pairs.	2	Apr. 22, 1908		153.33	W. B. Moses & Sons (Incorporated).

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		34		34				June 30	34	Good.
		66½		66½				do	66½	Do.
		10⅝		10⅝				do	10⅝	Do.
		100		100				do	100	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
90	Sept. 30, 1907		2	2				do	2	Do.
54	May 23, 1907		2	2				do	2	Do.
54	do		1	1				do	1	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		5		5				do	5	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
90	Sept. 30, 1907		2	2				do	2	
		5		5				June 30	5	Good.
42	Jan. 22, 1908		1	1				do	1	Do.
54	May 23, 1908		2	2				do	2	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Corridor, second floor.					
Cabinets ebonized					
Cabinets, mahogany					
Stands, mahogany, marble top					
Table, mahogany, long					
Chairs, arm, mahogany, upholstered in leather.					
Chairs, arm, mahogany, upholstered, in satin damask.					
Chairs, side, mahogany, upholstered in satin damask.					
Settees, mahogany, upholstered in leather.					
Chairs, side, mahogany, upholstered in leather.					
Screen, ebonized, 6-fold					
Seats, corner, upholstered in satin damask.					
Pillows, sofa, covered with satin damask					
Painting, oil, General Grant					
Engraving, Queen Victoria landing at Portsmouth.					
Bowl, covered, papier-maché					
Jardinieres, brass					
Vases, high, Italian marble					
Figure, bronze, woman with cupid on shoulder.					
Figure, bronze, woman with cupid at feet.					
Figure, bronze					
Jardiniere, bronze, low					
Table, ebony, marble top					
Table, ebony, square top					
Stand, ebony, carved					
Settee, upholstered in green satin damask.					
Chairs, arm, upholstered in green satin damask.					
Seat, window, long					
Cushion for long window seat, satin damask.					
Stand, high, mahogany					
Bookcase, revolving, walnut					
Chair, rocking, low, mahogany					
Chair, rocking, high, mahogany, cane seat.					
Figure, bronze, woman with lyre					
Photograph, framed in oak (cathedral)					
Photograph, framed in oak (Coliseum at Rome).					
Photograph, framed in oak, "Gladiator."					
Vases Hungarian ware					
Jardiniere, English					
Vase, flower, Dresden, 4 posts					
Table, round, mahogany					
Clock, mahogany					
Portrait, oil, President Millard Fillmore					
Portrait, oil, James A. Garfield					
Chair, rocking, mahogany					
Pillows, down, covered with red velour					
Table, tea, mahogany					
Screen					
Table					
Basket, music					
Lamp, B. & H., with shade					
Rugs, Wilton, with fringe					
Table, small, ebonized					
Table, carved, Flemish oak					
Rugs, made from carpet, "Item 5"					
Cover, loose, cotton damask					
Chairs, arm, upholstered in leather					
Stand, flower, wood, ebonized					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908. June 30	2	Good.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		18		18				do	18	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
SECOND FLOOR—continued.					
Corridor, second floor, east end.					
Carpet					
Cover, loose, cotton damask					
Chair, side, Flemish oak					
Curtains, window, pongee silk					
Corridor, second floor, west end.					
Chair, rocker, mahogany finish					
Table, mahogany finish					
Do					
Curtains, window, pongee silk.....set					
President's study.					
Rug, Wilton carpet					
Curtains, window, brown velour, poles, cords, etc., pairs.					
Bookcase, oak					
Lamp, electric, desk, 2 lights, dark, fire gilt, and shades.					
Small sewing room, north side.					
Awning					
Large southeast bathroom.					
Curtain, sash					
Large northeast bathroom.					
Curtains, sash					
Landing and stairs.					
Curtain, Brussels lace					
FIRST FLOOR.					
Pantry.					
Teapot					
Table, breakfast, walnut					
Table, long, mahogany					
Hamper, clothes, wicker					
Clock, wooden, eight-day					
Kettle, tea, galvanized-iron					
Trays, japanned					
Canister, tea, tin, japanned					
Towels, glass.....dozen					
Towels, roller.....do					
Knife, carving					
Fork, carving					
Knife, ham					
Refrigerator, nursery					
Steel, knife					
Tray, wood					
Chest, cake					
Boxes, sugar					
Basket for silver					
Coffeepot, small, tin					
Linoleum.....yards					
Teapots					
Plate warmer, electric					
Refrigerator					
Teapots					
Ice crusher					
Mustard holder					
Mats, asbestos					
Beef press					
Squeezer, lemon					
Kettle					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				June 30	1	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				June 30	1	Good.
		1		1				June 30	1	Good.
		1		1				June 10	1	Old.
		1		1				June 30	1	Good.
		1		1	1	Broken; worthless	The President	June 30	0	
		1		1				do	1	Good.
		1		1				do	1	Old.
		1		1				do	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		20¾		20¾				do	20¾	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		24		24				do	24	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Pantry—Continued.					
Hose, gas					
Corkscrews					
Paddles, butter ... pair					
Jar, cracker, glass					
Bread box					
Funnel, aluminum	1	Dec. 30, 1907		$0.60	Dulin & Martin Co.
Private dining room.					
Curtains, velour, double face ... pairs					
Covers, sideboard					
Goblets, cut glass ... dozen					
Saucers, cut glass, champagne ... do					
Glasses, cut glass, claret ... do					
Glasses, cut glass, cordial ... do					
Glasses, cut glass, punch, handled ... do					
Plates, cut glass ... do					
Cups and saucers, tea					
Tables, side, mahogany					
Cigar box, tin, square					
Fender, glass					
Fire set—tongs, poker, shovel, and stand					
Andirons, brass					
Clock, black marble					
Candelabra, high, bronze and gilt					
Figure, bronze, "Antelope"					
Kettle, tea, brass					
Stand, brass, for kettle					
Vases, majolica					
Jardiniere, blue and white paintings of birds on side.					
Jardiniere, Chinese					
Plate, Chinese					
Vase, yellow and white, with stand, English ware.					
Pitcher, fancy, blue, Hungarian ware					
Dishes, meat, silver-plated					
Plates, ice cream, cut glass ... dozen					
Tablecloths, linen					
Napkins, linen ... dozen					
Doilies, linen ... do					
Tongs, sugar, silver ... pair					
Screens					
Table, pine					
Salt cellars, glass					
Dishes, meat					
Dishes, bonbon					
Knives, fruit					
Cups, egg					
Knives					
Urn, bouillon, silver-plated					
Cloths, drawn work					
Baskets					
Sideboard, mahogany					
Table, mahogany extension					
Table, mahogany console					
Cabinet, mahogany, for china					
Mirror, mahogany and gold, "colonial"					
Chairs, mahogany and leather					
Chairs, mahogany, with arms, leather upholstered.					
Curtains, for windows ... pairs					
Rug, Yaprae, 15′ 5″ by 19′ 9″					
Mirror, French gold					
Table, mahogany, serving					
Folding screen, brass, for fireplace					
Screens, white silk					
Knives, pearl handles					
Pitchers, glass					
Cups and saucers					
Pitchers					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1	1	Worn-out; worthless.	The President	June 30	0	
		2		2				do	2	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
57	Jan. 22, 1908		1	1				do	1	Do.
		2		2				June 30	2	Good.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1½		1½				do	1½	Do.
		1½		1½				do	1½	Do.
		1		1				do	1	Do.
		1		1	1	Broken; worthless	The President	do	0	
		1½		1½				do	1½	Do.
		12		12	3	Broken; worthless	The President	do	9	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		5		5				do	5	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		6		6				do	6	Do.
		2		2				do	2	Do.
		12		12				do	12	Do.
		12		12				do	12	Do.
		12		12				do	12	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		10		10				do	10	Do.
		2		2				do	2	
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		12		12				do	12	Do.
		8		8				do	8	Do.
		2		2	2	Broken; worthless	The President	do	0	
		18		18	6	do	do	do	12	Do.
		12		12	4	do	do	do	8	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Private dining room—Continued.					
Tea caddy					
Spoons, salt					
Dishes, oatmeal					
Finger bowls, cut glass					
Finger bowl, plates					
Vase, cut glass					
Coffee pot, silver	1	Jan. 22, 1908		$32.50	Harris & Shafer Co.
Knives, fruit	12	Nov. 21, 1907		11.45	Dulin & Martin Co.
Ante or ushers' room.					
Water cooler					
Cabinet, key					
Rugs, Turkish					
Shade, white Holland					
Lambrequin, window					
Vases, Holland, delft					
Painting, Rio de Janeiro Bay					
Brush, hair					
Comb					
Shade, Holland					
Desk, Flemish finish					
Rug, Ouchac					
Curtains, window, red flax velours lined with silk, interlined with flannel, trimmed with fringe, center tassels, cord loops with slides, carved walnut poles, pair.					
Chair, revolving, mahogany, No. 1072					
Desk, mahogany, No. 292					
Chairs, arm, mahogany, No. 482					
Chair, mahogany, No. 482					
Table, side, mahogany, No. 1487					
Stand for water cooler					
Stand, umbrella					
Cover, desk, plush					
Basket, waste					
Register, tallying					
Drapery, window					
Main vestibule.					
Shades, window, white Holland					
Trays, card, silver					
Detector, watchman's					
Jardinieres, Istrian marble, white					
Zinc cases for same					
Lantern, electric, 12-light, antique, gold, glass panels, candelabra lamps					
Standards, electric, 10-light, dark fire gilt, lily shades.					
Curtains, windows each side of north door, red velours lined with silk, interlined with double flannel, trimmed with rich fringe, silk center tassels, silk cord loop with slides, poles, pairs.					
Frame, gold					
Portrait, President Roosevelt					
Cotton damask, for loose covers....lot					
Portrait, President McKinley					
Draperies, door					
Draperies, window					
Rug, Wilton					
Mat, door					
Covers, slip and loose					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		18		18				do	18	Do.
		24		24				do	24	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
49	Jan. 22, 1908		1	1				do	1	Do.
55	Dec. 18, 1907		12	12				do	12	Do.
		2		2				June 30	2	Good; old.
		1		1				do	1	Good.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1

Inventory of public property. Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
East Room.					
Shades, window, white Holland					
Curtains, heavy satin damask					
Chairs, side, upholstered in satin damask					
Chairs, corner, upholstered in satin damask.					
Chairs, arm, upholstered in satin damask					
Covers, loose					
Painting, President Washington					
Painting, President Jefferson					
Painting, President Lincoln					
Painting, Mrs. Martha Washington					
Table top, white pine					
Candelabra on mantels, 9 lights each, with marble bases, real candles, glass bobeches, dark fire gilt, pairs.					
Standards, electric, 12 lights, dark fire gilt, marble bases, candelabra lamps.					
Curtains for windows, made of damask, old gold color, lined with silk, interlined with molleton, front and bottom finished with fringe silk, center tassels, silk tassel loops, sets.					
Cornices, window, carved cherry wood and partly papier-maché, gilded, sets.					
Banquettes, 11 4′ 6″ by 1′ 6″, 2 2′ 9″ by 1′ 6″, richly carved, gilded, and glazed to an old effect, stuffed plain, covered with Bonton d'or colored velours de Genes, finished with gimp, loose colors of yellow figured linen.					
Tables, console, Louis XIV, gilded, marble tops.					
Andirons, Louis XIV, in gilt.....pairs					
Dogs, iron.....sets					
Fire tools, iron (poker and shovel to each), sets.					
Stands, gilt, for fire tools					
Jardinieres, bisque, ram's-head handles.					
Jardinieres, with raised Cupids and gold goat's-head handles.					
Cotton damask, for loose covers.....lot					
Awnings					
Lining, satin, for draperies.....yards					
Pedestals, marble					
Covers, slip	13	Apr. 9, 1908		$18.85	W. B. Moses & Sons (Incorporated).
Green Room.					
Andirons.....pair					
Covers, wall, cotton damask					
Laces, window, renaissance.....pairs					
Piano, Knabe, concert grand					
Sofa, upholstered, green satin damask					
Chairs, arm, upholstered, green satin damask all over.					
Chairs, upholstered, green satin damask all over.					
Stool, piano, upholstered					
Mirror over mantelpiece, gilded wood, with United States shield over center at top.					
Mirror on console table, gilded wood, with United States shield over center at top.					
Cabinet stand and cabinet combined, about 3 feet high, Japanese or Chinese lacquered and ornamented in gilt.					
Andirons, brass					
Fender, brass, low, open					
Fire screen, brass and green damask					
Fire screen, silk embroidered, United States coat of arms behind glass in black frame.					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908. June 30	6	Good.
		6		6				do	9	Do.
		9		9				do	12	Do.
		12		12				do	4	Do.
		4		4				do	8	Do.
		8		8				do	26	Do.
		26		26				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		7		7				do	7	Do.
		7		7				June 30	7	Good.
		13		13				do	13	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		168		168				do	168	Do.
		2		2				do	2	Do.
4	May 23, 1908		13	13				do	13	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		2		2				do	2	Old.
		1		1				do	1	Good.
		1		1				do	1	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Green Room—Continued.					
Stand, music, gilt, wood, presented by Austrian minister.					
Statuette, bronze, Diane de Cables					
Clock, bronze and onyx					
Vase, pink crown derby					
Vase, yellow crown derby					
Vase, decorated in gold, of porcelain Sèvres; no handle; picture of seaport, mountains in background, in foreground a peasant driving cattle, woman in red sitting on bench, child in blue and red standing by woman to the right.					
Oil painting, portrait President Buchanan.					
Oil painting, portrait President Jackson					
Oil painitng, portrait President Van Buren.					
Oil painting, portrait President Arthur					
Oil painting, portrait President Taylor					
Table console, gilded wood, marble top under mirror.					
Laces, Brussels, extra long.....pairs					
Shade, window					
Chairs, antique					
Table, tea, mahogany					
Screen, black, 4-fold					
Cushions, antique					
Lamp, bronze					
Shade, lamp, pink lined					
Covers, loose					
Oil painting, portrait John Quincy Adams.					
Oil painting, portrait Franklin Pierce					
Oil painting, portrait Andrew Johnson					
Oil painting, portrait Wm. Henry Harrison.					
Oil painting, portrait John Adams					
Oil painting, portrait Andrew Jackson					
Curtain poles					
Curtains, for windows; drapery decorations, pairs.					
Sofa, in cotton, painted white					
Pillows, in cotton					
Chairs, arm, in cotton, painted					
Chairs, side, in cotton					
Chairs, light, cane seats					
Chairs, in silk, gilded					
Rug, India					
Screen, brass, folding					
Standards, solid brass, for use at receptions.					
Draperies, window, silk velour					
Blue Room.					
Andirons.....pair					
Cover, wall, cotton damask					
Chair Ottoman, upholstered in blue damask.					
Ottomans, gilded-wood frames and legs, upholstered in blue damask.					
Covers, furniture					
Covers, wall					
Candelabra, 5 feet, gilded bronze, 12 branches in 2 horizontal planes of 6 each, 1 central branch, tripod bases.					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Broken.
		1		1				do	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2	2	Burned; worthless.	The President	do	0	
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Old.
		6		6				do	6	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		6		6				do	6	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		2		2				do	2	Do.
								June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		30		30				do	30	Do.
		15		15				do	15	Do.
		2		2				do	2	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Blue Room—Continued.					
Clock, mantel, gilded bronze, longitudinal pedestal about 20″ by 8″, sides covered with bas-reliefs of Roman trophies. On the pedestal a seated female figure, probably Goddess of War or Victory; has a Roman helmet on her head and a wreath in left hand. Made by "Thomière et Cie;" also marked at bottom of dial "Momer Aine."	....	.....	.....	.....	.....
Candlesticks, mantel, gilded bronze, 2 feet high, probably companions of clock; square pedestals on 4 claw feet; winged female figures on two sides of pedestal, carrying wreath in one hand and trumpet or quill pen in other.	....	.....	.....	.....	.....
Vases, dark blue Sèvres presented by President Faure, of France, to President McKinley.	....	.....	.....	.....	.....
Pillows or cushions in blue satin damask.	....	.....	.....	.....	.....
Mirror on gilded wood, console table.....	....	.....	.....	.....	.....
Vases, gilded, porcelain, each on a square base in two steps. Each has two handles, which are swans' necks and heads. One has picture of blind old man carrying youth on left arm, staff in right hand, helmet hanging from belt. The other has picture of blind old man and youth standing on rock overlooking sea; a lyre hangs from old man's back.	....	.....	.....	.....	.....
Vase, corrugated white porcelain, overlaid with pond lilies of same. Base is gilded, marked "Moore."	....	.....	.....	.....	.....
Hangings, window, curtains, and draperies, blue silk reps, to match walls, curtains finished front and bottom with embroidery. Draperies with embroidered stars and border lined with silk, interlined with molleton, finished with silk bullion fringe, silk tassel loops, silk center tassels, pairs.	....	.....	.....	.....	.....
Window poles, richly carved wood, with carved eagles, gilded and glazed.	....	.....	.....	.....	.....
Ventilators, Pullman, for windows.....	....	.....	.....	.....	.....
Stanchions, bronze, for roping off space..	....	.....	.....	.....	.....
Sofa, richly carved, white and gold, covered with brocade-trimmed gimp.	....	.....	.....	.....	.....
Chairs, arm, finished as above.....	....	.....	.....	.....	.....
Chairs, single, finished as above.....	....	.....	.....	.....	.....
Chairs, small, finished as above.....	....	.....	.....	.....	.....
Footstools, finished as above.....	....	.....	.....	.....	.....
Cordon, to cut off the room, covered with gold silk velours.	....	.....	.....	.....	.....
Screens, white silk.....	....	.....	.....	.....	.....
Shades, white silk.....	....	.....	.....	.....	.....
Screen, brass, folding, for fireplace.....	....	.....	.....	.....	.....
Carpet, Wilton, velvet, for use at receptions, yards.	....	.....	.....	.....	.....
Covers, slip, linen, for doors.....	2	Feb. 26, 1908	$14.00	$28.00	Clark, Davenport & Co.
Red Room.					
Cover, wall, cotton damask.....	....	.....	.....	.....	.....
Screen, fire gilt, gilded wood surmounted by eagle, silk embroidered center, surrounded by 4 cat o' nine tails, showing fireplace in background, man sitting in center before a table carrying the Bible, man kneeling on his right, three females standing behind him, a male and a female servant standing on extreme right of picture.	....	.....	.....	.....	.....

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
		1		1				1908. June 30	1	Good.
		2		2				do	2	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		6		6				do	6	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		40		40				do	40	Do.
		15		15				do	15	Do.
		1		1				do	1	Do.
		56		56				do	56	Do.
82	Aug. 7, 1907		2	2				do	2	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Red Room—Continued.					
Screen, fire, brass, brass frame, damask center.					
Fire tools, steel, brass handles, 4 pieces, set.					
Vases (Faïence) with ebony bases, about 4 feet high. One has painting of "Cupid in Prison," with Roman girl in front of door on one side, on other side a vase on a pedestal, with a fountain and Ionic portico in background. The other has on one side a Roman girl drinking at a tall fountain, 2 doves; on the other side a fluted pillar carrying a fountain bowl containing a dolphin, with a Corinthian portico in background.					
Stands for above, ebony					
Fender, brass					
Clock, gilt. On top a Roman sword and bowl of rings; at one side is a Roman warrior, etc.					
Vases, gilt, companion pieces to above clock.					
Candelabra, tall, bronze gilt, female figure standing on a globe. Five branches and one center branch; pedestals have bas-relief Roman trophy.					
Jardiniere, green, marked on bottom "F F 207."					
Vases, porcelain, magenta and gold bracket arms. Each has a picture of French revolutionary times.					
Ewer, green and gilt. Ewer has 2 Venuses riding a dolphin and looking in a hand glass. 1 Venus riding a dolphin, three Amors. 3 Amors, one with bow and arrow.					
Basin, has (1) Neptune riding the sea; (2) Venus riding a dolphin accompanied by a nymph.					
Bronze group, male figure seated on base of a broken pillar; female figure with face turned away; her right hand in right hand of the man, his left hand on her left shoulder, marked "Morcan."					
Bronze figure, soldier seated, ancient armor, boar's or bear's hand helmet; left elbow resting on a casket on his left knee, marked "Rtion Sauvage."					
Bronze figure, ancient warrior seated bareheaded, battle-ax or sceptor across knees.					
Settee, gilded wood, upholstered in red satin damask.					
Chairs, arm, rosewood, upholstered in red satin damask.					
Chairs, side, rosewood, upholstered in red satin damask.					
Chairs, arm, mahogany, upholstered in striped silk.					
Chairs, arm, gilded, wood, upholstered in red satin damask.					
Chairs, side, ditto as above					
Portrait, oil, President Polk					
Portrait, oil, President Tyler					
Portrait, oil, President Hayes					
Portrait, oil, President Harrison					
Portrait, oil, Mrs. Polk					
Portrait, oil, Mrs. Tyler					
Portrait, oil, Mrs. Van Buren					
Portrait, oil, Mrs. Hayes					
Portrait, oil, Mrs. Harrison					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
		1		1				1908. June 30	1	Good.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
Red Room—Continued.					
Vase, white and gold, cactus in bloom					
Carpet, Wilton, velvet.....yards					
Chair, antique					
Shade, silk					
Lamp, B and H					
Chair, rocking					
Globe, lamp					
Screen, 4-fold, black					
Pole, curtain, brass with rings					
Portrait, oil, President Zachary Taylor					
Portrait, oil, President James Monroe					
Portrait, oil, President Thomas Jefferson.					
Portrait, oil, President James Madison					
Engraving, President Washington					
Portrait, President Washington					
Portrait, oil, President Grant					
Poles, curtain					
Rug, Kinnan, 14′ 8″ by 19′					
Curtains, for windows with drapery decorations, pairs.					
Sofas, stuffed all over, red silk					
Chairs, arm, stuffed all over, red silk					
Pillows, feather, covered with red silk, damask, trimmed with fringe, gimp, and rosettes.					
Chairs, stuffed all over, wooden rim, model Henry II, covered with red velours, ornamented with fringe, gimp, and elfié					
Footstools, pillow-shaped, covered plain with red velours, ornamented with cord.					
Chairs, small, richly carved, white and gold, covered with brocade, trimmed with gimp.					
Andirons, gilt.....pairs					
Screen, brass					
Scarfs					
Centerpieces					
State dining room.					
Shades, white Holland					
Tables, side, walnut					
Table, breakfast, walnut					
Candelabra, gilt, 11 lights					
Stands, gilt, tall					
Holders, cut glass					
Group, bronze, pheasant with young					
Mirrors, gilt					
Plateau, in 7 pieces, gilt mirror frame					
Figures, gilt, women with wreaths					
Ornaments, gilt, used with plateau					
Screens, window					
Table, dining, round, mahogany					
Chairs, arm, oak, carved, velvet cushions.					
Chairs, high back, no arms, tapestry covered mahogany.					
Table, mahogany, extension, oblong shape, rounded corners.					
Sideboard, long, mahogany, carved, eagle legs, marble top, brass trimmings.					
Tables, serving, consolé, mahogany, carved eagle supports.					
Curtains, for windows.....pairs					
Head, stuffed, wild bison					
Head, stuffed, white Alaska sheep					
Head, stuffed, elk					
Head, stuffed, caribou					
Head, stuffed, antelope					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		20		20				do	20	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		6		6				do	6	Do
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		5		5				June 30	5	Good.
		4		4				do	4	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		5		5				do	5	Do.
		32		32				do	32	Do.
		1		1				do	1	Do.
		2		2	2	Not found		do	0	Do.
		1		1				do	1	Do.
		16		16				do	16	Do.
		20		20				do	20	Do.
		3		3				dg	3	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		50		50				do	50	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		5		5				do	5	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
State dining room—Continued.					
Head, stuffed, mountain sheep					
Head, stuffed, giant Alaska moose					
Head, stuffed, mountain lion					
Head, stuffed, grizzly bear					
Head, stuffed, Kadrap Island bear					
Tapestry, panel (north side)					
Rug, plain green, 24 by 37 feet					
Screen					
Fixtures, fireplace, wrought iron, large					
Firedogs, iron ... pair					
Fire-set, iron					
Screen, metal, folding, finished black					
Holders, ramakin					
Cups, ramakin					
Carpet, Wilton velvet, for use at receptions, yards.					
Covers for mounted heads, cotton damask.					
Goblets ... dozen					
Awning, window					
Main corridor.					
Pedestals, covered in red plush					
Bust, marble, President Fillmore					
Bust, marble, Hon. John Bright					
Bust, marble, Judge Hay					
Bust, marble, Unknown					
Bust, marble, Americus					
Jardinieres, majolica ware					
Portrait, oil, Grover Cleveland					
Covers, loose, cotton damask ... lot					
Pedestal, plush covered					
Table, marble top, round					
Table, marble top, mahogany					
Stands, marble, high					
Covers, loose					
Jardinieres, Chinese					
Screen, mahogany, 5-fold					
Screens, mahogany, small					
Chairs, mahogany, arm, upholstered					
Chair, arm					
Urns, brass					
Engraving, President Garfield					
Rugs, plain red, 12′ by 73′					
Standards, electric, 10 lights, dark fire gilt, lily shades.					
Banquettes, richly carved French walnut, stuffed, plain, covered with red silk velours, finished with gimp and large nails; loose covers of red linen.					
Curtains, East Room and State dining-room doors, red velours, lined with silk, interlined with double flannel, trimmed with fringe, rich, silk center tassels, silk cord loops, with slides, poles, pairs.					
South portico.					
Rug, carpet, velvet					
Awning, reed					
Awnings, window					
Curtains, drop canvas					
Chair, reclining					
Shade, lawn, with platform					
Awnings, lined with denim					
Awnings, roll, lined with denim					
Awnings, stationary, lined with denim					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		24		24				do	24	Do.
		36		36				do	36	Do.
		29		29				do	29	Do.
		5		5				do	5	Broken.
		1		1				do	1	Good.
		4		4				June 30	4	Good.
		1		1	1	Broken accidentally.		do	0	
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		10		10				do	10	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		8		8				do	8	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		12		12				do	12	Do.
		2		2				do	2	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		10		10				do	10	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		5		5	5	Worn out; worthless.	The President	do	0	
		3		3				do	3	Do.
		4		4				do	4	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
FIRST FLOOR—continued.					
South portico—Continued.					
Pillows, sofa					
Awning, with curtain					
Mat, door	1	Feb. 28, 1908		$3.00	Dulin & Martin Co.
North portico.					
Lantern, electric, 18 lights, fire gilt, glass panels.					
Trees, bay ... pairs					
GROUND FLOOR.					
Steward's room.					
Carpet, Wilton, brown ... yards					
Shades, gray Holland					
Desk, small, walnut					
Table, walnut, with drawer					
Washstand, walnut					
Table, walnut, small					
Chair, office, revolving					
Chair, oak, cane seat					
Table, oak, extension					
Safe, office, Farrel, Herring & Co					
Holders, candle, patent, plated					
Boxes for candleholders					
Box, shoe blacking, walnut					
Pillow, leather					
Basket, waste paper					
Chair, low, walnut					
Clock, regulator, 8-day, mahogany					
Clock, cherry, 8-day					
Rugs, camel's hair					
Bobashers, glass					
Shades, paper, red and silver					
Shades, paper, pink and silver					
Shades, paper, yellow and silver					
Shades, silk, red					
Shades, silk, yellow					
Shades, silk, pink					
Cover, piano, blue					
Cover, piano, linen					
Tub, foot, china, toilet					
Toilet set, china ... pieces					
Plates, fish, Hayes set					
Plates, salad, Hayes set					
Plates, oyster, Hayes set					
Plates, game, Hayes set					
Plates, dinner, Hayes set					
Plates, soup, Hayes set					
Clock, brass, out of order					
Saucers, coffee, Hayes set					
Cups, coffee, Hayes set					
Cups, coffee, after-dinner, Hayes set					
Saucers, coffee, after-dinner, Hayes set					
Plates, dinner, Lincoln set					
Plates, soup, Lincoln set					
Plates, soup, small, Lincoln set					
Plates, breakfast, Lincoln set					
Plates, bread and butter, Lincoln set					
Plates, small, Haviland, odd					
Plates, ice cream, Haviland, pink					
Plates, soup, small, white china					
Plates, tea, white china					
Plates, butter, individual, odd					
Curtains, cretonne ... pair					
Pyramid, tin					
Trunks for storing silver					
Buckets, water, galvanized					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		6		6				June 30	6	Good.
		1		1	1	Worn out; worthless.	The President	do	0	
39	Mar. 14, 1908		1	1				do	1	Do.
		1		1				June 30	1	Good.
		2		2				do	2	Do.
		88½		88½				June 30	88½	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		120		120				do	120	Do.
		10		10				do	10	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		64		64				do	64	Do.
		98		98				do	98	Do.
		100		100				do	100	Do.
		20		20				do	20	Do.
		122		122				do	122	Do.
		128		128				do	128	Do.
		121		121				do	121	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Broken.
		6		6	1	Broken; worthless	The President	do	5	2 good, 3 broken.
		38		38				do	38	Good.
		34		34				do	34	Do.
		22		22				do	22	Do.
		7		7				do	7	Do.
		24		24				do	24	Do.
		5		5				do	5	Do.
		1		1				do	1	Do.
		23		23				do	23	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		28		28				do	28	Do.
		25		25				do	25	Do.
		14		14				do	14	Do.
		6		6				do	6	Do.
		10		10				do	10	Do.
		2		2				do	2	Do.
		45		45				do	45	Do.
		6		6				do	6	Do.
		6		6				do	6	Do.
		13		13				do	13	Do.
		12		12				do	12	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		2		2				do	2	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Steward's room—Continued.					
Box, walnut, for storing silver					
Trays, walnut					
Trays, serving, wooden					
Funnels, tin					
Washboard					
Bed, walnut, single, folding					
Carriers, tin, hot-water					
Keyboard					
Curtains, lace, Brussels.....pair					
Refrigerator, oak (cold storage)					
Chairs, horn, upholstered					
Box, tin, for sugar, capacity 50 pounds					
Trays, japanned, large					
Trunks containing silver (6 in all).					
1. Marked "M. le Baron de Tuyll," wooden trunk, covered with leather, bound with iron.					
2. Wooden trunk, covered with leather, iron bound, brass plate marked "No. 2 M. le Baron de Tuyll."					
3. Leather-covered trunk, bound with iron; has brass plate marked "Baron de Tuyll."					
4. Oak trunk, bound with iron; brass plate marked "James Monroe."					
5. Canvas-covered trunk, bound with iron, marked "President's House."					
6. Trunk covered with black leather and bound with iron.					
Tureen, soup, stand, inside and top. Made in France by Christopher. The mark on this silver was first used in 1797. All the silver is marked "President's House."					
Platter, large, fancy border; Platter, medium, fancy border; Plate, fancy border; Plates, thread border — French plate.					
Chocolate pot, thread border; Caster, wine, thread border — Silver					
Casters, salt, for 2 cellars, French plate					
Dishes, vegetable, round, with handles					
Casters, wine, fancy border					
Sifter, sugar, thread pattern					
Spoons, ice cream					
Forks, breakfast, beaded pattern, silver. They were made under Cleveland's second Administration from 84 silver forks and 57 gilt forks that were worn down. These forks were taken to the Treasury Department, weighed, and melted. The silver was then sent to the silversmith's and 96 breakfast and 96 dinner forks made.					
Spoons, tea, thread pattern, silver					
Knives, fruit, pearl handles, with gilt shield in handle. Gilt.					
Spoon, mustard, without handle. Gilt					
Trays, scalloped edge, English plate					
Plates, fancy border; made by Christopher. His mark was first used in 1797. French plate.					
Platters, French plate, made by Christopher; thread pattern.					
Mug and stand, sirup, plated, marked "President's House."					
Caster, egg, 6 cups and 6 spoons					
Casters, wine, silver handle, openwork					
Casters, wine, silver					
Caster, wine, plated, will hold 3 decanters					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		3		3				do	3	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		3		3				do	3	
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		9		9				do	9	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		95		95				do	95	Do.
		47		47				do	47	Do.
		47		47				do	47	
		1		1				do	1	Do.
		4		4				do	4	Do.
		19		19				do	19	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Trunks containing silver (6 in all)—Continued.					
Skewers, attelètes, 3 eagle and 3 squirrel tops.					
Baking shells, shaped like scalloped shells, plated.					
Cheese scoop, celluloid handle, plated					
Knives, pearl handles, English plated					
Knives, celluloid handles, plated					
Dishes, pudding, with rings					
Serving trays, fancy border, openwork, Gorham plate.					
Pans, crumb, plated, thread border					
Scrapers, crumb, plated, thread border					
Holders, bouquet, leaf pattern, made by Meriden Brittania Co.					
Platters, beaded pattern, Gorham plate					
Baskets, cake, without handles, English plate.					
Buckets, ice, with handles					
Bell, with black marble					
Spoons, table, thread border, silver					
Forks, dinner, silver, beaded border					
Forks, breakfast, silver, beaded border					
Forks, oyster, silver, plain handle					
Forks, oyster, silver					
Sugar sifter, silver, thread pattern; Christopher.					
Scissors, grape, silver.....pairs					
Forks, salad, beaded pattern, silver					
Spoons, salad, beaded pattern, silver					
Spoons, tea, thread pattern. These were originally gilt French silver.					
Spoons, tea, thread pattern, silver					
Spoons, after dinner, coffee, thread pattern.					
Spoons, berry, fancy border, silver					
Spoons, salad, thread pattern, silver					
Forks, salad, thread pattern, silver					
Rings, napkin, Nos. 1 to 6					
Mustard pots, French silver, made by Christopher.					
Dishes, round, vegetable, with handles, silver.					
Cigar lighter, low, silver					
Cigar lighter, high, buckhorn handle, silver.					
Cruets, pepper, tall, silver					
Forks, asparagus, combination, silver					
Scraper, crumb, thread pattern, silver					
Fork and spoon combined, silver, for salad.					
Knives, butter, thread pattern					
Extinguisher, candle, silver					
Porcupine, silver, for toothpicks					
Spoons, ice cream, fancy pattern handle					
Ship, silver, "Hiawatha"					
Lake for ship, silver					
Spoons, dessert, thread pattern, French gilt.					
Spoons, dessert, thread pattern, gilt					
Strainer, tea					
Spoons, mustard, gilt, thread pattern					
Spoons, mustard, gilt, very slender					
Bowls, salad, silver, fancy borders					
Bowls, salad, silver, Gorham, beaded pattern.					
Dishes, olive, silver, fancy border					
Candelabra, silver, 5 lights					
Bowls, sugar, one has a top					
Pitcher, cream, French silver, tall					
Pitcher, cream, silver, thread border					
Tea set, 4 pieces, for tray					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908. June 30		
		6		6					6	Good.
		6		6				do	6	Do.
		1		1				do	1	Do.
		88		88				do	88	Do.
		108		108				do	108	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		6		6				do	6	Do.
		6		6				do	6	Do.
		26		26				do	26	Old.
		6		6				do	6	Good.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		92		92				do	92	Do.
		84		84				do	84	Do.
		72		72				do	72	Do.
		69		69				do	69	Do.
		12		12				do	12	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		35		36				do	36	Do.
		53		53				do	53	Do.
		83		83				do	83	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		6		6				do	6	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		12		12				do	12	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		57		57				do	57	Do.
		22		22				do	22	Do.
		1		1				do	1	Do.
		8		8				do	8	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Trunks containing silver (6 in all)—Continued.					
Compotes, silver, fancy border					
Coffeepots, French silver, ivory handles					
Teapot, French silver, ivory handle					
Teapot, silver, ebony handle					
Sauce boats, thread border, silver					
Stands, thread border, silver					
Tongs, sugar, silver, thread pattern					
Ladles, sauce, silver, thread pattern					
Ladles, sauce, silver, beaded pattern					
Ladles, soup, silver, thread pattern					
Knife, pie, silver, beaded pattern					
Dishes, bonbon, silver, Gorham, fancy border.					
Dishes, bonbon, silver, Gorham, openwork border.					
Dishes, bonbon, gilt, fancy border					
Spoons, serving, French silver, thread border.					
Kettle and stand, tea, silver, with eagle, ornamental handle; kettle is made to tip.					
Compotes, silver, fancy border, openwork.					
Toast rack, silver					
Toast rack, silver plated					
Tureen, soup, stand, inside and top marked "President's House."					
Platter, French plated, large, fancy border.					
Platters, French plated, medium, thread border.					
Plates, French plated					
Pitcher, cream, silver, ivory handle					
Pot, hot water, silver, ivory handle					
Caster, wine, silver, thread border, for 2 decanters.					
Casters, salt, French plated, for 2 cellars each.					
Knives, fruit, gilt					
Sifter, sugar, gilt, thread pattern					
Spoons, berry, gilt, thread pattern					
Forks, dinner, silver, beaded					
Dishes, vegetable, silver, round, with handle on the side.					
Casters, wine, silver, fancy border					
Spoons, salt, gilt, thread pattern					
Casters, wine, silver, fancy borders, with tops.					
Tureens, soup, silver; 3 parts each, stand, inside, and top; top has eagle ornament for handle.					
Cigar cutters, silver	3	Jan. 16, 1908		$3.00	Berry & Whitmore Co.
Silver-plated ware.					
Spoons, table					
Spoons, tea, German silver					
Spoons, tea, stamped "President's House."					
Forks, stamped "President's House"					
Knives, ivory handles					
Knives, plated					
Trays, with handles, large English plate, marked "President's House."					
Candelabra, 5 lights, Gorham plate					
Candelabra, 5 lights					
Pot, coffee, "International"					
Dishes, butter					
Casters, wine					
Casters, table					
Dish, chafing					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
		6		6				1908. June 30	6	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		5		5				do	5	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		12		12				do	12	Do.
		12		12				do	12	Do.
		12		12				do	12	Do.
		8		8				do	8	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		5		5				do	5	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		48		48				do	48	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		95		95				do	95	Do.
		2		2				do	2	Do.
		11		11				do	11	Do.
		10		10				do	10	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
31	Mar. 4, 1908	3		3				do	3	Do.
		32		32				June 30	32	Good.
		8		8				do	8	Do.
		281		281				do	281	Do.
		300		300				do	300	Do.
		38		38				do	38	Do.
		19		19				do	19	Do.
		2		2				do	2	Do.
		10		10				do	10	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Silver-plated ware—Continued.					
Pitchers, water					
Pitchers, water, fancy border					
Pitchers, water, large, plain					
Trays, for pitchers					
Trays, for pitchers, fancy border					
Tea set, for tray, plain					
Stand, tall, for bouquet holder					
Candlestick, plain					
Bottle lables, silver					
Holders, ramekin					
Nutcrackers					
Lamps, spirit					
Nut pickers, pearl handles					
Nut pickers, plated					
Urn, capacity 3 quarts, coffee					
Holders, bottles					
Glassware.					
Vases, glass					
Bowls, finger (Coat of arms)					
Plates, ice cream (Coat of arms)					
Glasses, sherry, stem (Coat of arms)					
Glasses, claret (Coat of arms)					
Bowls, champagne (Coat of arms)					
Tumblers, champagne (Coat of arms)					
Glasses, Burgundy (Coat of arms)					
Goblets (Coat of arms)					
Plates, ice cream (Coat of arms)					
Decanters					
Saltcellars					
Bottles, water					
Dish, celery, flat					
Glasses, punch					
Dishes, berry, oblong					
Bowls, rose					
Bowl					
Dishes, berry					
Dishes, olive, with handles					
Dishes, olive, without handles					
Dishes, olive					
Bottles, water					
Glasses, Sauterne, green					
Glasses, Burgundy, ruby					
Glasses, Burgundy, ruby					
Glasses, liqueur					
Bowls, finger					
Dishes, sauce					
Plates, ice cream					
Bowls, sugar					
Glasses, sherry					
Glasses, Rhine wine					
Glasses, claret					
Glasses, punch, tall, with handles					
Glasses, celery					
Decanters, tall					
Stoppers, cut glass					
Glasses, Madeira, ruby					
Glasses, port					
Glasses, liqueur, engraved, Roman border, old.					
Glasses, sherry, engraved, Roman border, old.					
Glasses, champagne, engraved, Roman border, old.					
Glasses, sherry, engraved with vine, odd.					
Glasses, liqueur, stem, engraved with vine, odd.					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity	
								1908.		
		3		3				June 30	3	Good.
		3		3				do	3	Do.
		2		2				do	2	Do.
		6		6				do	6	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		24		24				do	24	Do.
		15		15				do	15	Do.
		4		4				do	4	Do.
		5		5				do	5	Do.
		11		11				do	11	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		10		10				June 30	10	Good.
		82		82				do	82	Do.
		70		70				do	70	Do.
		83		83				do	83	18 broken, 65 good.
		92		92				do	92	Good.
		89		89				do	89	Do.
		65		65				do	65	Do.
		77		77				do	77	Do.
		91		91				do	91	7 broken, 84 good.
		12		12				do	12	Good.
		7		7				do	7	Do.
		24		24				do	24	Do.
		26		26				do	26	Do.
		1		1				do	1	Do.
		173		173	20	Damaged; worthless.	The President	do	153	Do.
		6		6				do	6	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		7		7				do	7	Do.
		2		2				do	2	Do.
		18		18				do	18	Do.
		40		40				do	40	Do.
		96		96				do	96	Do.
		63		63				do	63	Do.
		24		24				do	24	Do.
		19		19				do	19	Do.
		21		21				do	21	Do.
		51		51				do	51	Do.
		11		11				do	11	Do.
		2		2				do	2	Do.
		52		52				do	52	Do.
		7		7				do	7	Do.
		28		28				do	28	Do.
		25		25				do	25	Do.
		4		4				do	4	Do.
		17		17				do	17	Do.
		10		10				do	10	Do.
		54		54				do	54	Do.
		63		63				do	63	Do.
		19		19				do	19	Do.
		64		64				do	64	Do.
		37		37				do	37	Do.
		16		16				do	16	Do.
		26		26				do	26	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Glassware—Continued.					
Glasses, Sauterne, engraved with vine, odd.					
Glasses, white wine, engraved with vine, odd.					
Glasses, claret, engraved with vine, odd.					
Glasses, Rhine wine, engraved with vine, odd.					
Glasses, Burgundy, engraved with vine, odd.					
Bowls, finger, engraved with vine, odd.					
Bottles, water, engraved with vine, odd.					
Dishes, berry, engraved with vine, odd.					
Decanters, with handles, engraved with vine, odd.					
Decanters, engraved with vine, odd					
Bottle, water, cut glass					
Glasses, cocktail, engraved with star					
Glasses, Roman punch					
Glasses, Madeira, engraved Roman border.					
Glasses, claret, engraved Roman border.					
Glasses, Burgundy, engraved Roman border.					
Romers, engraved, vine border					
Bowls, large, used with gilt plateau in state dining room.					
Dishes, bonbon, iridescent					
Stands, cake, high					
Dishes, berry, high					
Dishes, celery, engraved vine border					
Decanters, with handles					
Vases					
Saltcellars, individual					
Tumblers ... dozen					
Pitchers, cut glass					
Glasses, water, cut glass					
Glasses, apollinaris, cut glass					
Glasses, champagne, cut glass					
Glasses, sherry, cut glass					
Bowls, finger, cut glass					
Glasses, brandy and soda, cut glass					
Goblets	36	Feb. 3, 1908		$6.00	Dulin & Martin Co.
Tumblers ... dozen	18	May 2, 1908	$1.75	31.50	do
Pitchers	3	May 14, 1908	3.25	9.75	do
Goblets ... dozen	3	May 18, 1908	2.00	6.00	do
Chinaware.					
Teapots					
Toilet sets					
Cups ... dozen					
Saucers ... do					
Ewers, china					
Basins, china					
Dishes, soap					
Bowl					
Mugs					
Vases					
Chambers, china					
Jars, slop					
Dish, butter					
Bowls, oatmeal					
Platters					
Dishes, vegetable					
Bowls					
Pitchers, water					
Plates, egg					
Dish, chocolate					
Pitchers	6	Oct. 22, 1907	.65	3.90	Dulin & Martin Co.
Cups and saucers	18	do		15.00	do
Toilet set	1	do		4.00	do
Soap dishes	6	Jan. 4, 1908	.75	4.50	do

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		42		42				June 30	42	Good.
		64		64				do	64	Do.
		71		71				do	71	Do.
		4		4				do	4	Do.
		27		27				do	27	Do.
		35		35				do	35	Do.
		23		23				do	23	Do.
		3		3				do	3	Do.
		6		6				do	6	Do.
		6		6				do	6	Do.
		1		1				do	1	Broken.
		18		18				do	18	Good.
		20		20				do	20	Do.
		71		71				do	71	Do.
		14		14				do	14	Do.
		31		31				do	31	Do.
		20		20				do	20	Do.
		2		2				do	2	Do.
		24		24				do	24	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		4		4				do	4	Do.
		11		11				do	11	Do.
		18½		18½	20	Broken; worthless	The President	do	202	Do.
		2		2				do	2	Do.
		10		12				do	10	Do.
		36		36				do	36	Do.
		12		12				do	12	Do.
		54		54				do	54	Do.
		36		36				do	36	Do.
		35		35				do	35	Do.
39	Mar. 14, 1908		36	36	14	Broken; worthless	The President	do	22	Do.
55	June 26, 1908		18	18	8	do	do	do	208	Do.
55	do		3	3				do	3	Do.
55	do		3	3				do	3	Do.
		2		2				June 30	2	Good.
		3		3				do	3	Do.
		3½		3½				do	3½	Do.
		3½		3½	5	Broken; worthless	The President	do	37	Do.
		3		3				do	3	Do.
		2		2				do	2	Do.
		7		7	1	Broken; worthless	The President	do	6	Do.
		1		1				do	1	Do.
		3		3	3	Broken; worthless	The President	do	0	
		2		2				do	2	Do.
		3		3				do	3	Do.
		2		2	2	Broken; worthless	The President	do	0	
		1		1				do	1	Do.
		6		6				do	6	Do.
		4		4	2	Broken; worthless	The President	do	2	Do.
		4		4	1	do	do	do	3	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		24		24				do	24	Do.
		1		1				do	1	Do.
15	Nov. 25, 1907		6	6				do	6	Do.
15	do		18	18				do	18	Do.
15	do		1	1				do	1	Do.
56	Feb. 15, 1908		6	6				do	6	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost. Unit.	Cost. Total.	Bought from—
GROUND FLOOR—continued.					
Chinaware—Continued.					
Mugs	6	Feb. 15, 1908	$0.50	$3.00	Dulin & Martin Co.
Jars, slop	6	do		9.75	do
Pitchers	3	Mar. 5, 1908	.45	1.35	do
Pitchers	3	do	.60	1.80	do
[Lincoln set.]					
Plates, soup					
Plates, dinner					
Plates, breakfast					
Platters, fish..\ red border, with eagle					
Plate, bread../ in center.					
Pitchers					
Compotes					
Stands, cake					
Stands, pyramid					
Stands, fruit					
Bowls, punch					
Platters					
[Grant set.]					
Plates, soup; yellow border					
Plates, dinner; flowers painted in center					
Stands, cake					
Stands, fruit					
Compotes					
Plates, soup; plain yellow band					
Platters, meat					
Platters, fish					
Plates, soup					
Plates, soup, small; yellow, with flowers					
Plates, dinner; painted in center					
[Hayes set.]					
Plates, soup; decorated by Theo. Davis					
Plates, dinner; decorated by Theo. Davis.					
Plates, oyster; decorated by Theo. Davis.					
Plates, game; decorated by Theo. Davis					
Plates, fish; decorated by Theo. Davis					
Plates, cracker and cheese; decorated					
Plates, punch					
Plates, dessert					
Plates, salad					
Dishes, gravy boats					
Platter, fish					
Platters, game; ornamented with picture of canvasback duck.					
Platters, meat; turkey decorations					
Platters, ice cream; ornamented with picture of snowshoe.					
Cups and saucers, coffee; odd shape					
Cups, coffee; after-dinner					
[Arthur set.]					
Plates, dessert, odd					
Cups and saucers, Dresden, small					
Plate, dessert					
[Cleveland set.]					
Plates, dessert, turquoise					
Plates, dessert, ivory and gold					
Plates, dessert, odd					
Plates, dessert, scalloped edge, blue					
Plates, dinner, blue border					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
56	Jan. 4, 1908	....	6	6	2	Broken; worthless	The President	June 30	4	Good.
56	do	....	6	6	1	do	do	do	5	Do.
36	Apr. 21, 1908	....	3	3	....			do	3	Do.
36	do	....	3	3	....			do	3	Do.
....		6	....	6	....			June 30	6	Good.
....		56	....	56	....			do	56	Do.
....		37	....	37	....			do	37	Do.
....		6	....	6	....			do	6	Do.
....		1	....	1	....			do	1	Do.
....		4	....	4	....			do	4	Do.
....		16	....	16	....			do	16	Do.
....		12	....	12	....			do	12	Do.
....		3	....	3	....			do	3	Do.
....		9	....	9	....			do	9	Do.
....		2	....	2	....			do	2	Do.
....		7	....	7	....			do	7	Do.
....		10	....	10	....			June 30	10	Good.
....		3	....	3	....			do	3	Do.
....		5	....	5	....			do	5	Do.
....		5	....	5	....			do	5	Do.
....		8	....	8	....			do	8	Do.
....		20	....	20	....			do	20	Do.
....		4	....	4	....			do	4	Do.
....		1	....	1	....			do	1	Do.
....		8	....	8	....			do	8	Do.
....		13	....	13	....			do	13	Do.
....		29	....	29	....			do	29	Do.
....		25	....	25	....			June 30	25	Good.
....		59	....	59	....			do	59	Do.
....		48	....	48	....			do	48	Do.
....		32	....	32	....			do	32	Do.
....		6	....	6	....			do	6	Do.
....		50	....	50	....			do	50	Do.
....		36	....	36	....			do	36	Do.
....		70	....	70	....			do	70	Do.
....		7	....	7	....			do	7	Do.
....		2	....	2	....			do	2	Do.
....		1	....	1	....			do	1	Do.
....		2	....	2	....			do	2	Do.
....		2	....	2	....			do	2	Do.
....		2	....	2	....			do	2	Do.
....		8	....	8	....			do	8	Do.
....		17	....	17	....			do	17	Do.
....		25	....	25	....			June 30	25	22 good, 3 broken.
....		5	....	5	....			do	5	Good.
....		1	....	1	....			do	1	Do.
....		95	....	95	....			June 30	95	Good.
....		18	....	18	....			do	18	Do.
....		13	....	13	....			do	13	Do.
....		11	....	11	....			do	11	9 good, 2 broken.
....		84	....	84	....			do	84	Good.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Chinaware—Continued.					
[Cleveland set]—Continued.					
Plates, dinner, red and gold					
Plates, dinner, pink and gold border					
Plates, breakfast, green and gold					
Platter, ice cream, pink and gold					
Plates, ice cream, pink and gold					
Dishes, bonbon, flags of nations					
Plates, breakfast, rolled edge					
Cups, tea					
Saucers, tea					
Cups, after-dinner					
Saucers, after-dinner					
Plates, Haviland, odd					
Plate, deep, red, dinner					
Plates, rolled edge					
[Harrison set.]					
Plates, soup					
Plates, dinner					
Plates, breakfast					
Plates, bread and butter					
Plates, dinner					
Plates, breakfast					
Plates, breakfast	36	Jan. 6, 1908		$120.00	Dulin & Martin Co.
Plates, breakfast	24	Feb. —, 1908		80.00	do
[McKinley set.]					
Plates, oyster					
Plates, dessert, rose border					
Plates, breakfast, green and gold border					
Plates, breakfast, blue and garland of roses.					
Plates, butter, individual					
Cups, coffee, white and green					
Saucers, coffee, white and green					
Bowls, blue and white					
Pitchers, blue and white					
Plates, soup, deep, red border					
Pitcher, small, blue					
Jar, cracker, Haviland					
Ornament, china, "Hen on nest"					
Bowl, punch, high stand, blue and white					
Ash receiver, shell, imitation					
Ramakins, French china					
Cups, tea, odd, Haviland					
Cups and saucers, coffee, green and gold border.					
Cups and saucers, large, colored bowl					
Cups, tea, colored bowl					
Cups, after-dinner coffee					
Plate, tea, deep red border					
Plate, breakfast, deep red border					
Plate, dinner, deep red border					
Plates, soup, narrow yellow border					
Plate, dinner, narrow yellow border					
Cups, odd sizes					
Saucers, odd sizes					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		84		84				June 30	84	83 good, 1 broken.
		95		95				do	95	93 good, 2 broken.
		96		96				do	96	92 good, 4 broken.
		1		1				do	1	Good.
		3		3				do	3	Do.
		18		18				do	18	15 good, 3 broken.
		393		393	18	Broken; worthless	The President	do	375	Good.
		191		191				do	191	Do.
		190		190				do	190	Do.
		190		190				do	190	178 good, 12 broken.
		193		193				do	193	Good.
		3		3				do	3	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		92		92				June 30	92	Good.
		80		80				do	80	Do.
		70		70				do	70	Do.
		55		55				do	55	Do.
		15		15				do	15	Do.
		26		26				do	26	Do.
56	Feb. 15, 1908		36	36				do	36	Do.
36	Apr. 20, 1908		24	24				do	24	Do.
		24		24				June 30	24	Good.
		24		24				do	24	16 good, 8 broken.
		24		24				do	24	Good.
		12		12				do	12	Do.
		22		22				do	22	7 good, 15 broken.
		5		5				do	5	Good.
		11		11				do	11	Do.
		6		6				do	6	5 good, 1 broken.
		2		2				do	2	Good.
		9		9				do	9	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		24		24				do	24	Do.
		14		14				do	14	Do.
		15		15				do	15	Do.
		2		2				do	2	Do.
		5		5				do	5	Do.
		9		9				do	9	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		17		17				do	17	Do.
		1		1				do	1	Do.
		18		18				do	18	Do.
		41		41				do	41	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Chinaware—Continued.					
[Roosevelt set.]					
White and gold:					
Plates, dinner					
Plates, breakfast					
Plates, fish					
Plates, tea					
Plates, soup					
Plates, bread and butter					
Cups and saucers, after-dinner coffee					
Cups and saucers, tea					
Plates, oyster					
Dishes, 16-inch					
Dishes, 18-inch					
Red and white:					
Cups, bouillon					
Saucers, bouillon					
Linen.					
Pillows					
Tablecloths, 10½ yards long, embroidered "U. S."					
Tablecloth, 5 yards long					
Tablecloth, 9 yards long					
Tablecloth, 6½ yards long					
Tablecloth, 5¼ yards long					
Tablecloths, 4 by 3 yards					
Tablecloth, 7 yards long					
Tablecloth, 4½ yards long					
Tablecloth, 3 by 3 yards					
Tablecloths, 3 by 3 yards, embroidered "U. S."					
Tablecloths, 4 yards long					
Tablecloths, 2½ yards long; servants'					
Tablecloths, 1½ yards long; servants'					
Tablecloths, 1¼ yards long; cut down from long cloths.					
Covers, sideboard; hemstitched, embroidered "U. S."					
Covers, sideboard, fringed					
Napkins, fringed					
Napkins, 28½ by 36 inches					
Napkins, large; embroidered "U. S."					
Napkins, large; embroidered "U. S." in red.					
Napkins, breakfast; embroidered "U. S." in red.					
Napkins, poppy pattern; embroidered "U. S." in red.					
Napkins, fancy border; embroidered "U. S." in red.					
Napkins, flower border; embroidered "U. S." in red.					
Doilies, renaissance; open center					
Centerpieces, renaissance					
Doilies, large, German					
Doilies, medium, German					
Centerpieces					
Centerpiece, 1¼ yards square; renaissance.					
Centerpiece, embroidered; scalloped edges.					
Doilies, drawn work; small; square; embroidered in silk.					
Doilies, drawn work					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		180		180				June 30	180	179 good, 1 broken.
		120		120				do	120	119 good, 1 broken.
		120		120				do	120	Good.
		120		120				do	120	Do.
		120		120				do	120	Do.
		60		60				do	60	58 good, 2 broken.
		96		96				do	96	92 good, 4 broken.
		120		120				do	120	118 good, 2 broken.
		120		120				do	120	Good.
		12		12				do	12	Do.
		12		12				do	12	Do.
		41		41				do	41	Do.
		41		41				do	41	Do.
		6		6				June 30	6	Good.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		8		8				do	8	Do.
		3		3				do	3	Do.
		4		4	4	Worn out; worthless.	The President	do	0	
		4		4				do	4	Do.
		4		4				do	4	Do.
		23		23	23	Worn out; worthless.	The President	do	0	
		3		3				do	3	Do.
		8		8				do	8	Do.
		17		17				do	17	Do.
		42		42				do	42	Do.
		9		9	9	Worn out; worthless.	The President	do	0	
		10		10				do	10	Do.
		27		27				do	27	Do.
		4		4	4	Worn out; worthless.		do	0	
		45		45	45	do	The President	do	0	
		17		17				do	17	Do.
		1		1				do	1	Do.
		12		12				do	12	Do.
		12		12				do	12	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		21		21	14	Worn out; worthless.	The President	do	7	Do.
		17		17				do	17	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost. Unit.	Cost. Total.	Bought from—
GROUND FLOOR—continued.					
***Linen*—Continued.**					
Doilies, square; hemstitched; embroidered in yellow silk.					
Doilies, scalloped edge; embroidered in silk.					
Doilies, appliqué					
Felt, table ... pieces					
Sheets, linen; double					
Sheets, linen; three-quarter					
Sheets, cotton; double					
Sheets, cotton; three-quarter					
Pillow slips, wide linen					
Pillow slips, medium					
Pillow slips, medium					
Bolster cases, linen					
Bedspreads, double					
Bedspreads, three quarter					
Bath towels, fringed					
Bath towels, hemstitched					
Towels, crash, servants'					
Towels, crash, servants'					
Towels, fringed, white, old					
Towels, fringed, red, old					
Towels, pink border, embroidered "U.S."					
Rugs, bath, dark brown					
Doilies, Turkish					
Scarf, bureau, hemstitched					
Scarf, with blue lining					
Doilies, lace					
Covers, stand, edged with lace					
Pillow shams, ruffled					
Pillow shams, lace ... pair					
Pillow shams, hemstitched and embroidered, pairs.					
Pillow shams, lace edge ... pair					
Pillow shams, sheet					
Cover, table, lace edge					
Cover, table, fringed					
Spreads, bed					
Blankets ... pair					
Sheets, linen					
Doilies, hemstitched					
Napkins, hemstitched					
Napkins, embroidered					
Doilies					
Tablecloths					
Doilies, finger bowl					
Blanket, bed					
Towels, glass	60	Oct. 3, 1907		$21.25	Woodward & Lothrop.
Sheets	36	Nov. 25, 1907		45.00	do
Do	36	do		48.60	do
Pillowcases	48	do		14.40	do
Towels	72	do		18.00	do
Towels, bath	36	Dec. 14, 1907		45.00	do
Spreads, bed, pique	4	Oct. 18, 1907		60.00	W. B. Moses & Sons (Incorporated).
Storeroom.					
Cooler, water, porcelain lined					
Stands, music, iron, used by band					
Chairs, wooden					
Platform, wooden, used by leader of band					
Mat, cocoa					
Baskets, wood					
Racks, skeletons, coat					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908. June 30		
		7		7					7	Good.
		8		8				do	8	Do.
		6		6				do	6	Do.
		9		9				do	9	Do.
		12		12				do	12	Do.
		48		48				do	48	Do.
		7		7				do	7	Do.
		45		45				do	45	Do.
		14		14	14	Worn out; worthless.	The President	do	0	
		35		35	33	do	do	do	2	Do.
		15		15				do	15	Do.
		11		11				do	11	Do.
		21		21				do	21	Do.
		7		7				do	7	Do.
		20		20				do	20	Do.
		24		24				do	24	Do.
		60		60	40	Worn out; worthless.	The President	do	20	Do.
		20		20	20	do	do	do	0	
		20		20	20	do	do	do	0	
		72		72	50	do	do	do	22	Do.
		15		15				do	15	Do.
		6		6	6	Worn out; worthless.	The President	do	0	Do.
		45		45				do	45	Do.
		30		30				do	30	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		9		9				do	9	Do.
		12		12				do	12	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		40		40				do	40	Do.
		1		1				do	1	Do.
		11		11				do	11	Do.
		12		12	12	Worn out; worthless.	The President	do	0	Do.
		36		36				do	36	Do.
		72		72				do	72	Do.
		12		12	12	Worn out; worthless.	The President	do	0	Do.
		24		24				do	24	Do.
		84		84				do	84	Do.
		2		2				do	2	Do.
19	Nov. 25, 1907		60	60				do	60	Do.
81	Dec. 26, 1907		36	36				do	36	Do.
81	do		36	36				do	36	Do.
81	do		48	48				do	48	Do.
81	do		72	72				do	72	Do.
51	Jan. 22, 1908		36	36				do	36	Do.
70	Mar. 30, 1908		4	4				do	4	Do
		1		1	1	Worn out; worthless.	The President	June 30	0	
		84		84				do	84	Good.
		20		20				do	20	
		1		1				do	1	Do.
		1		1				do	1	Old
		1		1				do	1	Good.
		6		6				do	6	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Storeroom—Continued.					
Tags, brass, used at receptions.....lot..					
Table leaves, oak, belong to extension table.					
Wheelbarrow, used in engine room					
Shovels, coal					
Ax, short handle					
Ax, long handle					
Truck with rubber-tired wheels					
Fan, electric, 16-inch					
Comforts, bed					
Pails, swill					
Pails, water					
Scoop, sugar					
Pads, table, felt					
Stencils, brass.....set..					
Chairs, folding.....dozen..					
Hamper, clothes					
Coal chute, canvas					
Tennis marker					
Washboards					
Pitcher, covered					
Dishes, soap					
Mouse traps					
Dishes, soap					
Mat, door					
Spade, small					
Spade, No. 2					
Toilet set					
Pitchers					
Brush					
Comb					
Brooms					
Tent tops, marquee					
Fans, electric					
Gloves, rubber.....pairs..					
Picks, ice					
Jackets, duck					
Baskets, scrap					
Basket for silver					
Vases, glass					
Ladder, step					
Tennis net					
Cuspidor, china					
Candle stand, brass					
Laces, renaissance.....pairs..					
Spring, double					
Pitchers					
Plates, pie					
Biggin, coffee					
Bread raisers					
Grater					
Boilers, double					
Masher, potato					
Wringer for clothes					
Chair, oak					
Laces, renaissance.....pairs..					
Dustpans					
Shades, mica.....dozen..					
Shades, candle					
Uniforms, livery					
Funnel					
Brushes, hearth					
Baskets, lunch					
Pails					
Pail					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Old.
		4		4				do	4	Good.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		6		6	6	Worn out; worthless.	The President	do		
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		12		12				do	12	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		6		6				do	6	Old.
		2		2				do	2	Good.
		1		1				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		1		1				do	1	Do
		6		6				do	6	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		6		6				do	6	3 good; 3 old.
		6		6	6		The President	do	0	
		2		2				do	2	1 good; 1 old.
		1		1				do	1	Good.
		6		6				do	6	Do.
		1		1				do	1	Do.
		1		1				do	1	Do
		1		1				do	1	Broken.
		1		1				do	1	Good.
		1		1				do	1	Worn out.
		1		1				do	1	Good.
		6		6				do	6	Do.
		6		6				do	6	Old.
		1		1				do	1	Good.
		1		1				do	1	Old.
		1		1				do	1	Good.
		3		3				do	3	1 good; 2 old.
		1		1				do	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		5		5				do	5	Old.
		18		18				do	18	9 good; 9 old.
		17		17				do	17	Good.
		76		76				do	76	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Storeroom—Continued.					
Napkins					
Cloth, table					
Cloths, table					
Napkins					
Do					
Cloths, table					
Do					
Do					
Do					
Pad, rubber stamp					
Jackets, waiters					
Aprons, waiters					
Sweepers, carpet					
Basket	1	Oct. 30, 1907		$2.75	Woodward & Lothrop
Aprons, servants'	12	Nov. 4, 1907		5.34	do
Jackets, servants'	12	do		18.00	do
Sweeps, floor	2	Mar. 25, 1908		11.00	Dulin & Martin Co.
Kitchen.					
Shades, window					
Table, pine					
Cups, fish dozen					
Coffeepot, granite					
Knife and fork, carving					
Pots, granite					
Boiler, meat					
Bowls, china					
Pitchers, china					
Cups, china					
Strainer, soup					
Shaker, pepper					
Boiler, fish					
Measure, quart					
Pans, bake, iron					
Rollers, towel					
Grater					
Knives, potato					
Basins, paper					
Tables, pine					
Pans, sauce, copper					
Kettle, stock, copper					
Boilers, fish, copper					
Boiler, ham					
Bowl, beating, copper					
Braziers, copper					
Sugar melter, copper					
Molds, fancy, large, jelly, copper					
Molds, fancy					
Molds, plain, copper					
Pan, melting, copper, for sugar					
Molds, tin, fancy					
Molds, brick ice cream, tin					
Molds, round, tin					
Molds, melon, tin					
Mortar, marble					
Pestles, for mortar					
Rack, galvanized iron					
Molds, lead, individual, ice cream					
Block, meat, round					
Chopper, meat, "Enterprise"					
Boards, oak					
Cleavers					
Saw, meat					
Ladles, soups and sauces					
Molds, tin, individual, small					
Molds, tin, individual, medium					
Cutters, cake, fancy					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		12		12				June 30	12	Good.
		1		1				do	1	Do.
		6		6				do	6	Do.
		180		180				do	180	Do.
		120		120				do	120	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		8		8				do	8	Do.
		1		1				do	1	Do.
		12		12	12	Worn out; used as cleaning cloths.	The President	do	0	Do.
		18		18				do	18	Do.
		3		3	3	Worn out; worthless.	The President	do	0	Do.
81	Dec. 26, 1907		1	1				do	1	
81	do		12	12				do	12	
81	do		12	12				do	12	
36	Apr. 21, 1908		2	2				do	2	
		2		2				June 30	2	Good.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		7		7				do	7	Do.
		1		1				do	1	Do.
		1		1				do	1	Old.
		7		7				do	7	Do.
		12		12				do	12	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2	1	Worn out; worthless.	The President	do	1	Do.
		4		4				do	4	Do.
		24		24				do	24	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		9		9				do	9	Do.
		19		19				do	19	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		5		5				do	5	Do.
		8		8				do	8	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		24		24				do	24	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		71		71				do	71	Do.
		16		16				do	16	Do.
		2		2				do	2	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
***Kitchen*—Continued.**					
Molds, block, tin, small					
Molds, block, tin, medium					
Molds, block, tin, pyramid					
Formers, pastry, cup					
Mold, tin, cone-shape					
Molds, flat, pear-shaped, small					
Cutters, pastry					
Chair, arm, painted red					
Freezers, ice cream					
Shaker, pepper					
Coffee mill					
Clock, 8-day, wooden					
Baskets, frying, iron					
Pots, porcelain-lined					
Waffle iron					
Molds, cake, tin, large, round					
Pans, drip					
Steamer					
Steamer, patented					
Kettle, tea, iron					
Colanders, tin					
Pan, bread					
Boiler, double, agate ware					
Crocks					
Pans, frying					
Broilers, wire					
Pans, muffin, Russian ware					
Pans, bread, Russian ware					
Colanders					
Pans, roll, Russian ware					
Grater, nutmeg					
Knife, chopping					
Strainers, gravy, tin					
Measure, quart, graduated					
Box, knife, walnut					
Funnel, tin					
Grater, bread, tin					
Dredges, tin					
Cans, garbage, galvanized iron, small					
Pan, "Bain Marie," to use on range					
Tureen, soup, yellow ware					
Cups, hotel china, white					
Saucers, hotel china, white					
Dishes, vegetable, hotel china					
Knife, palette, long					
Knife, sabatier, scallop					
Openers, can, 1 nickel and 1 iron					
Corkscrew, wooden handle					
Scoop, potato					
Steel					
Dishes, meat					
Kettle, tea					
Griddle					
Boilers, double					
Pans, jelly					
Washer, lettuce					
Pans, baking					
Muffin rings					
Spoons, table					
Measure, tin					
Shaker, salt					
Measures, tin					
Knife, carving					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		64		64				June 30	64	Good.
		14		14				do	14	Do.
		23		23				do	23	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		28		28				do	28	Do.
		5		5				do	5	Do.
		1		1				do	1	Do.
		1		1	1	Damaged; worthless.	The President	do	0	
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		13		13				do	13	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	No good.
		1		1				do	1	Good.
		1		1	1	Worn out; worthless.	The President	do	0	
		2		2	2	Broken; worthless	do	do	0	
		21		21				do	21	Do.
		4		4	1	Worn out; worthless.	The President	do	3	Do.
		2		2				do	2	Do.
		8		8				do	8	Do.
		5		5				do	5	2 good, 3 old.
		5		5				do	5	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		2		2	2	Worn out; worthless.	The President	do	0	
		1		1				do	1	Do.
		1		1				do	1	Do.
		5		5				do	5	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		8		8				do	8	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		18		18				do	18	Do.
		5		5	3	Worn out; worthless.	The President	do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	21	Do.
		1		1	1	Worn out; worthless.	The President	do	0	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Kitchen—Continued.					
Tea caddy					
Forks					
Bowl, chop					
Turners, cake					
Cover, apple					
Shears, sardine ... pair					
Knife, chop					
Can, tin, for flour					
Mold					
Jar, for tea					
Pans					
Cutters, tin ... set					
Steamer					
Cutter, meat					
Dishes, butter					
Colander					
Dish, butter, covered					
Bowls					
Boilers, oatmeal					
Pans, meat					
Pot, bean					
Openers, can					
Molds, fish					
Pans, sauce					
Awning					
Brushes, polishing, electric					
Dishes, bake					
Corers, apple					
Squeezers, lemon					
Boiler, coffee					
Teaspoons					
Box, salt					
Pans, steel					
Skimmers, milk					
Scoops, potato					
Pins, rolling					
Cups and saucers					
Carvers ... set					
Kettle					
Cans, garbage					
Pans, sauce					
Pans, roast					
Pot, stock					
Cups, custard					
Sieves					
Pots, coffee					
Strainers					
Teapots					
Knives					
Pail					
Boilers, rice					
Molds					
Molds, ice cream					
Bowls, yellow					
Platters					
Chopper, meat					
Pitchers					
Needles, larding ... set					
Bowls					
Casseroles					
Kettle, preserving					
Pan, dish	1	Aug. 19, 1907		$1.90	Dulin & Martin Co.
Teapot	1	Sept. 10, 1907		.35	do
Coffee pot	1	Sept. 23, 1907		.75	do
Spoons, wooden	2	Oct. 8, 1907	$0.15	.30	do
Freezer, ice cream	1	Oct. 22, 1907		2.85	do
Pans, muffin	2	Nov. 6, 1907		.75	do
Pans, baking	6	Nov. 15, 1907		1.40	do

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		19		19				do	19	Do.
		1		1	1	Worn out; worthless.	The President	do	0	
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Broken.
		1		1				do	1	Old.
		1		1				do	1	Broken.
		12		12	4	Broken; worthless.	The President	do	8	Good.
		2		2				do	2	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		12		12	4	Worn out; worthless.	The President	do	8	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		3		3				do	3	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		12		12				do	12	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		4		4				do	4	Old.
		2		2				do	2	Good.
		2		2				do	2	Do.
		6		6				do	6	Broken.
		1		1				do	1	Good.
		1		1				do	1	Do.
		3		3				do	3	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		18		18				do	18	Do.
		4		4	2	Worn out; worthless.	The President	do	2	Do.
		6		6	2	do	do	do	4	Do.
		4		4	1	do	do	do	3	Do.
		3		3				do	3	Do.
		40		40				do	40	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		4		4				do	4	Do.
		6		6				do	6	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		14		14	7	Broken; worthless.	The President	do	7	Do.
		1		1				do	1	Do.
		16		16				do	16	Do.
		17		17	1	Broken; worthless.	The President	do	16	Do.
		1		1				do	1	Do.
47	Sept. 23, 1907		1	1				do	1	
33	Oct. 29, 1907		1	1				do	1	
33	do		1	1				do	1	
15	Nov. 25, 1907		2	2				do	2	
15	do		1	1				do	1	
55	Dec. 18, 1907		2	2				do	2	
55	do		6	6				do	6	

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Kitchen—Continued.					
Brushes for cleaning silver	12	Nov. 23, 1907		$6.00	Dulin & Martin Co
Knives, potato	6	Mar. 5, 1907		2.55	do
Kettle	1	Apr. 7, 1907		1.70	do
Ramekins	24	July 13, 1907		4.00	do
Mold	1	Jan. 2, 1907		.85	do
Pans, drip	4	do	$0.75	3.00	do
Bread toaster	1	Jan. 6, 1907		.45	do
Engine room.					
Coal hods, galvanized iron					
Shovels, fire, galvanized					
Pump, electric					
Baskets, wood					
Traps, rat					
Plumber's room.					
Square, steel, 2-foot					
Grindstone					
Machine, drilling, and 12 drills					
Stocks and dies ... set					
Pump, Nopple, force and suction					
Plungers, cup					
Trowel, mason's					
Do					
Wrench, monkey					
Tape line, 50-foot, metallic					
Electrician's room.					
Pliers, cutting, 6-inch, side ... pair					
Pliers, Bernard, 6-inch ... do					
Pliers, 6-inch ... do					
Wrench, Stillson, 8-inch					
Screw-driver, 3-inch					
Screw-driver, 6-inch					
File, rat-tail, 6-inch					
Gentlemen's Senatorial dressing room.					
Carpet, Wilton ... yards					
Mirror, over mantel					
Wardrobes, golden oak					
Covers, loose, cotton damask					
Water cooler					
Towels, roller ... dozen					
Wardrobe, oak					
Ladies' Senatorial dressing room.					
Covers, loose, cotton damask					
Gentlemen's diplomatic dressing room.					
Covers, loose, cotton damask					
Diplomatic assembly reception room.					
Carpet, Wilton ... yards					
Sofas, with backs and arms, gilded wood frames, upholstered in blue damask.					
Chairs, arm, same as above					
Chairs, without arms, same as above					
Divan, circular, gilded wood frame, 6 legs, etc.					
Ladies' diplomatic dressing room.					
Covers, loose, cotton damask					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
25	Dec. 18, 1907		12	12				June 30	12	Good.
26	Apr. 21, 1908		6	6				do	6	Do.
30	May 23, 1908		1	1				do	1	Do.
31	Aug. 28, 1907		24	24				do	24	Do.
34	Feb. 15, 1908		1	1				do	1	Do.
35	do		4	4				do	4	Do.
36	do		1	1				do	1	Do.
		12		12				June 30	12	Good.
		4		4				do	4	Do.
		1		1				do	1	Do.
		12		12				do	12	Do.
		2		2				do	2	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		141½		141½				June 30	141½	Good.
		1		1				do	1	Do.
		2		2				do	2	Do.
		6		6				do	6	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		9		9				June 30	9	Good.
		8		8				June 30	8	Good.
		115½		115½				June 30	115½	Good.
		4		4				do	4	Do.
		4		4				do	4	Do.
		8		8				do	8	Do.
		1		1				do	1	Do.
		12		12				June 30	12	Good.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
GROUND FLOOR—continued.					
Corridor.					
Drapery, satin damask, red.....pairs..					
Settees, reupholstered in satin damask.					
Settees, oak frames, upholstered in red.					
Arm chairs, oak frames, upholstered in red.					
Covers, loose, cotton damask					
Pads, silk velour, for china closets					
Carpet, red, Wilton.....yards..					
Cabinet, china					
Covers, slip	4	Apr. 18, 1908		$21.00	W. B. Moses & Sons (Incorporated).
WEST TERRACE.					
Servants' dining room.					
Table, dining, plain					
Chair, youth's					
Tablecloths					
Napkins					
Bowls, oatmeal					
Plates, soup					
Cups, egg					
Bowls, sugar					
Pitchers					
Knives					
Spoons, tea					
Forks					
Cruets, salt					
Cruets, pepper					
Chairs					
Cruets, glass					
Teapots					
Machine, sewing, "Domestic"					
Table, extension, 8-foot, golden oak					
Sideboard, golden oak					
Matting, white china.....yards..					
Shade, window					
Cups and saucers.....dozen..					
Beds, maple, double					
Tumblers					
Cups and saucers					
Dishes, butter	2	Feb. 5, 1908	$0.75	1.50	Dulin & Martin Co...
Servants' rooms.					
Carpet, Wilton.....yards..					
Matting, white china.....do....					
Bed, iron					
Mattresses, hair					
Spring, woven wire					
Pillows, feather					
Mattress					
Chair, arm, upholstered					
Rocker, wicker					
Chair, arm, high back, painted red					
Rocker, cherry					
Table, pine					
Bureau, ash					
Washstand, ash					
Comforters					
Toilet set					
Desk, oak					
Chairs, wicker					
Mirror, oak frame					
Stand, shaving, mahogany					
Bed, small, iron					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		2		2				June 30	2	Good.
		4		4				do	4	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		5		5				do	5	Do.
		15		15				do	15	Do.
		840½		840½				do	840½	Do.
		6		6				do	6	Do.
54	May 23, 1908		4	4				do	4	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		10		10				do	10	Do.
		10		10				do	10	Do.
		12		12				do	12	4 good; 8 broken.
		12		12	3	Broken; worthless.	The President	do	9	Good.
		6		6				do	6	Do.
		2		2				do	2	Do.
		4		4				do	4	Do.
		9		9				do	9	Do.
		20		20	2	Lost in house		do	18	Do.
		12		12				do	12	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		9		9	1	Damaged; worthless.	The President	do	8	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Old.
		1		1				do	1	Good.
		1		1				do	1	Do.
		40		40				do	40	Do.
		2		2				do	2	Do.
		2		2	1	Broken; worthless.	The President	do	23	Do.
		1		1				do	1	Do.
		15		15				do	15	Do.
		24		24	5	Broken; worthless.	The President	do	19	Do.
39	Mar. 14, 1908	2	2	4	2	do		do	2	Do.
		65		65				June 30	65	Good.
		370		370				do	370	Old.
		1		1				do	1	Good.
		3		3				do	3	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Old.
		2		2				do	2	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
WEST TERRACE—continued.					
Servants' rooms—Continued.					
Wardrobe, walnut					
Chairs, spline seat					
Washstand, mahogany					
Curtains, cotton damask					
Bedstead, enamel and brass, with spring.					
Mattress, cotton					
Comfort, bed					
Matting, white china.....yards					
Beds, iron, 3' by 6'					
Mattresses, hair and cotton					
Chairs, arm, upholstered in green rep					
Laundry.					
Irons, polishing					
Baskets					
Irons					
Cooler, water					
Stoves, gas, 2-burner, with 8 small iron heaters.					
Stove, gas, 2-burner, with 2 sadiron heaters.					
Tables, pine, large					
Board, bosom					
Wardrobe, maple					
Truck, flat, with rubber-tired wheels					
Iron holders					
Iron stands					
Boiler					
Wringers					
Rolls, wringer					
Washboards					
Boards, ironing					
Bowls	4	Oct. 8, 1907	$0.35	$1.40	Dulin & Martin Co.
Comb, hair	1	Mar. 30, 1907		.40	Woodward & Lothrop.
Irons, polishing	2	Mar. 5, 1908	.50	1.00	Dulin & Martin Co.
Bouquet room.					
Vases					
Box, ice, oak, "Ridgeway"					
Jardinieres	36	Mar. 16, 1908	.50	18.00	Albert Leavy
WEST TERRACE, TOP.					
Fountain, white marble					
Plant boxes, tile front with duplicate inner boxes of zinc.					
Settees, stone					
EAST TERRACE.					
Corridor.					
Settee, rustic					
Table, rustic					
Chair, rustic					
Rope, covered with silk velour					
Cooler, water	1	July 1, 1907		7.50	Dulin & Martin Co.
POLICEMEN'S LOBBY.					
Stand, water cooler					
Cooler, water					
Rug, green, Wilton carpet	1	June 30, 1908			Transferred from storehouse.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		245		245				do	245	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		4		4	1	Lost in house		June 30	3	Good.
		2		2				do	2	Do.
		32		32				do	32	Do.
		1		1	1	Worn out; worthless.	The President	do	0	
		4		4	2	Sold at auction	do	do	2	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		6		6	6	Worn out; worthless.	The President	do	0	
		8		8	2	Broken; worthless	do	do	6	Do.
		1		1	1	do	do	do	0	
		2		2				do	2	Do.
		2		2				do	2	Do.
		12		12				do	12	8 good, 4 broken.
		3		3				do	3	Good.
15	Nov. 25, 1907		4	4				do	4	Do.
28	Apr. 20, 1908		1	1				do	1	Do.
36	Apr. 21, 1908		2	2				do	2	Do.
		42		42				June 30	42	Good.
		1		1				do	1	Do.
23	Apr. 20, 1908	72	36	108				do	108	Do.
		1		1				June 30	1	Good.
		20		20				do	20	Do.
		6		6				do	6	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
31	Aug. 28, 1907		1	1				do	1	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Worthless.
			1	1				do	1	Good.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
EAST TERRACE, TOP.					
Fountain, white marble					
Plant boxes, tile front with duplicate inner boxes of zinc.					
Settees, stone					
Carriage call, electric	1	Nov. 22, 1908		$545.00	National Electric Supply Co.
EAST AND WEST TERRACES.					
Trees, bay					
Trees, boxwood					
Tree, standard bay					
Trees, pyramid bay					
Hose, rubber ....feet					
MISCELLANEOUS LIST.					
Mat, lamp, plush					
Machine, sewing, Singer					
Trays					
Pitchers and trays, plated					
Rope barrier's, plush					
Flag, storm					
Carpet, Wilton ....yards					
Pique ....do					
Vases					
Table, pine					
Beds					
Mattresses, hair and cotton					
Beds, white enamel					
Chairs, splan seat					
Stove, gas, 2-burner					
Bureau sets					
Rack, bicycle					
Cabinet					
Desk					
Shade, lamp; cut					
Vases					
Lamp, silver					
Chairs, wooden ....dozen					
Covers, furniture; cotton damask					
Stands, music					
Table, pine; used in state dining room; covered with green baize.					
Scale, platform; Fairbanks No. 11					
Hose, air; black rubber ....feet					
Stand, mahogany; marble top					
Boxes, hat ....lot					
Carpet, Wilton; red					
Desk, walnut					
Pail, galvanized iron					
Chairs, splan seat					
Mirror, toilet					
Costumers, mahogany					
Bench, oak, with green velour cushion					
Screen, 4-fold, covered with rep					
Screen, 4-fold, covered with tapestry					
Curtains, red flax velour, lined with silk, put up with poles, pairs.					
Boxes, wooden					
Reels, hose					
Sprayer, automatic, and rods					
Settee, rustic					
Table, rustic					
Chairs, arm, white enamel					
Settees, white enamel					
Extinguishers, fire					
Rubber tubing used on fire extinguishers, feet.					
Bottles, fire extinguisher					
Padding ....yards					
Damask, cotton ....do					
Table, rustic					
Detector, time, watchman's					

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		20		20				do	20	Do.
		6		6				do	6	Do.
23	Jan. 4, 1908		1	1				do	1	
		31		31				June 30	31	Good.
		72		72				do	72	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		300		300				do	300	Do.
		1		1				June 30	1	Good.
		1		1				do	1	Do.
		6		6				do	6	Do.
		3		3				do	3	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		273½		273½				do	273½	Do.
		56		56				do	56	Do.
		36		36				do	36	Do.
		3		3				do	3	Do.
		2		2				do	2	Do.
		6		6				do	6	Do.
		4		4				do	4	Do.
		6		6				do	6	Do.
		2		2				do	2	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Broken.
		36		36				do	36	Good.
		1		1				do	1	Do.
		6		6				do	6	Do.
		271		271				do	271	Do.
		5		5				do	5	Do.
		1		1				do	1	Old.
		1		1				do	1	Broken, no good.
		200		200				do	200	Good.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		13		13				do	13	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		1		1				do	1	Do.
		4		4				do	4	Do.
		2		2				do	2	Do.
		30		30				do	30	Do.
		50		50				do	50	Do.
		3		3				do	3	Do.
		8½		8½				do	8½	Do.
		57½		57½				do	57½	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
MISCELLANEOUS LIST—continued.					
Wrench, Coes					
Shades, candelabra, silk					
Curtains, window, imperial Swiss. pairs					
Jardinieres					
Water can					
Wood baskets					
Cuspidors					
Hangers, coat					
Hangers, trousers					
Comfort					
Combs					
Ladder					
Mats, white rubber					
Matting, cocoa ... yards					
Screens, silk					
Hangers, coat					
Shades, lamp					
Screen, porch, 8 by 13 feet					
Stretcher					
Canopy					
Screen, canvas, for grounds					
Curtain, canvas					
Hammock					
Bronze eagle					
Chairs, oak					
Carpet, Wilton, red					
Chairs, walnut, perforated seats					
Cuspidor, china					
Chair, arm, walnut, upholstered in leather.					
Stand, wash, walnut					
Bottle, leather					
Fender, brass					
Brooms, whisk					
Fans, electric					
Carpet, green velvet ... yards					
Hammers					
Chambers					
Covers, cotton damask, for chandeliers, etc.					
Mats, cocoa					
Stretcher, carpet					
Scale, Howe. 400 pounds					
Shades, window, white Holland					
Shades, electric, white and pink silk					
Hods, coal					
Chair pads, velvet					
Shade roller, tin					
Duster handles, bamboo					
Baskets, for wood					
Brushes, floor polishers					
Curtains, wedgewood cloth, for tennis court.					
Hamper, clothes					
Rat traps					
Brushes, hair					
Combs					
Linoleum ... yards					
Mat, cocoa					
Do					
Baskets					
Baskets, clothes					
Hose, rubber ... feet	300	Sept. 17, 1908	$0.10	$30.00	The M. Lindsay Rubber Manufacturing Co.
Basket, waste	1	Sept. 23, 1908		2.00	Dulin & Martin Co.
Carpet sweepers	3	do	4.50	13.50	do

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
		1		1				June 30	1	Good.
		10		10				do	10	Do.
		1		1				do	1	Do.
		72		72				do	72	Do.
		1		1				do	1	Do.
		6		6				do	6	Do.
		4		4				do	4	Do.
		24		24				do	24	Do.
		24		24				do	24	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		6		6				do	5	Do.
		83		83	83	Worn out; worthless.	The President	do	0	
		15		15				do	15	Do.
		24		24				do	24	Do.
		5		5				do	5	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1				do	1	Do.
		3		3				do	3	Do.
		1		1	1	Broken; worthless	The President	do	0	
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		1		1				do	1	Do.
		12		12	12	Worn out	The President	do	0	
		4		4				do	4	Do.
		68		68				do	68	Do.
		2		2				do	2	Do.
		8		8				do	8	Do.
		49		49				do	49	Do.
		2		2	2	Worn out; worthless.	The President	do	0	
		1		1				do	1	Do.
		1		1				do	1	Do.
		10		10				do	10	Do.
		100		100				do	100	Do.
		20		20	9	Worn out; worthless.	The President	do	11	Do.
		303		303				do	303	Do.
		1		1				do	1	Do.
		2		2				do	2	Do.
		15		15				do	15	Do.
		4		4				do	4	Do.
		4		4				do	4	
		2		2				do	2	Do.
		2		2				do	2	Do.
		5		5				do	5	Do.
		2		2				do	2	Do.
		13½		13½				do	13½	Do.
		1		1	1	Worn out; worthless.	The President	do	0	
		4		4				do	4	Do.
		5		5				do	5	Do.
		3		3				do	3	Do.
31	Sept. 20, 1907		300	300				do	300	Do.
33	Oct. 29, 1907		1	1				do	1	Do.
33	do		3	3				do	3	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
MISCELLANEOUS LIST—continued.					
Trays	6	Oct. 22, 1907	$0.85	$5.10	Dulin & Martin Co
Do	6	do	1.00	6.00	do
Cans, ash	2	Dec. 10, 1907	3.75	7.50	do
Baskets, wood	2	Dec. 12, 1907		15.00	do
Buckets	3	Jan. 14, 1908	.45	1.35	do
Carpet sweeper	1	do		6.00	do
Cots, canvas	4	Feb. 14, 1908	2.50	10.00	M. G. Copeland Co
Whetstone	1	May 18, 1908		.30	Dulin & Martin Co
Hods, coal	12	Feb. 18, 1908		6.00	W. S. Jenks
PRESIDENT'S OFFICE BUILDING.					
Globe, geographical					
Map frame					
Vase, Hampshire pottery	1	Oct. 21, 1907		2.25	Dulin & Martin Co
PRESIDENT'S STABLE.					
Stove, small, and pipe					
Boiler, copper, for heating water					
Hose, rubber, ¾-inch feet					
Stove, No. 40, "Comet," with pipe					
Hose, rubber, 1-inch, 3-ply feet					
Hods, coal					
Shades, window					
Oilcloth yards					
Table sections used at state dinners					
Trusses for table used at state dinners					
Stove					
Linoleum, inlaid yards					
Matting, cocoa do	103	July 31, 1907		83.70	W. B. Moses & Sons (Incorporated).
Shades, Scotch Holland	9	do		12.85	do
Stove	1	Nov. 26, 1907		12.50	W. S. Jenks
STABLE OF PUBLIC BUILDINGS AND GROUNDS.					
Comb, curry					
Scraper, sweat					
Horse, bay					
Blankets, horse					
Surcingle					
Boots, rubber pair					
Brush, horse					
Brushes, mane					
Robe, lap					
Mare, bay					
Wagon, Dayton, with top and two seats					
Harness, single set					
Harness, single, Concord					
Blanket, woolen, for street use					
Blanket, stable					
Blanket, rubber					
Robes, light-weight, for wagon					
Robe, fur					
Boots, ankle pair					
Boots, calking do					
Cover, horse					
Storm front, for wagon					
Net, fly					
Soaking pads, felt pair					
Muzzle, wire, for horse					
Clippers, horse pair					
Sheet, horse, summer					
Brush, dandruff					
Harness, solid nickel mounted set	1	Sept. 11, 1907		65.00	Lutz & Co
Whip	1	Nov. 1, 1907		1.50	do
Blanket, horse	1	Nov. 5, 1907		6.00	do
Boots, ankle pair	1	Mar. 27, 1908		1.50	do

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Voucher.		On hand last return	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
15	Nov. 25, 1907	....	6	6	....			June 30	6	Good.
15	....do.....	....	6	6	....			...do....	6	Do.
57	Jan. 22, 1908	....	2	2	....			...do....	2	Do.
57	....do.....	....	2	2	....			...do....	2	Do.
56	Feb. 15, 1908	....	3	3	....			...do....	3	Do.
56	....do.....	....	1	1	....			...do....	1	Do.
50	Feb. 14, 1908	....	4	4	....			...do....	4	Do.
55	June 26, 1908	....	1	1	....			...do....	1	Do.
40	Mar. 14, 1908	....	12	12	....			....do...	12	Do.
....	.....	1	....	1	....			June 30	1	Good.
....	.....	1	....	1	....			....do ...	1	Do.
15	Nov. 25, 1907	....	1	1	....			....do ...	1	Do.
....	.....	1	....	1	....			June 30	1	Good.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	20	....	20	....			....do ...	20	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	100	....	100	....			....do ...	100	Do.
....	.....	2	....	2	....			....do ...	2	Do.
....	.....	15	....	15	....			....do ...	15	Do.
....	.....	6¾	....	6¾	....			....do ...	6¾	Do.
....	.....	12	....	12	....			....do ...	12	Do.
....	.....	16	....	16	....			....do ...	16	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	17½	....	17½	....			....do ...	17½	Do.
90	Sept. 30, 1907	....	103	103	....			....do ...	103	Do.
90	....do.....	....	9	9	....			....do ...	9	Do.
67	Dec. 21, 1907	....	1	1	....			....do ...	1	Do.
....	.....	1	....	1	....			June 30	1	Good.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	2	....	2	....			....do ...	2	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	3	....	3	....			....do ...	3	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	1	Dead		....do ...	0	
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	2	....	2	....			....do ...	2	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	1	....	1	....			....do ...	1	Do.
....	.....	2	....	2	....			....do ...	2	Do.
....	.....	4	....	4	....			....do ...	4	Do.
40	Oct. 29, 1907	....	1	1	....			....do ...	1	Do.
51	Dec. 18, 1907	....	1	1	....			....do ...	1	Do.
51	....do.....	....	1	1	....			....do ...	1	Do.
30	Apr. 20, 1907	....	1	1	....			....do ...	1	Do.

Inventory of public property, Executive Mansion, June 30, 1908—Continued.

Description.	Number or quantity.	Received.	Cost.		Bought from—
			Unit.	Total.	
STOREHOUSE AT PROPAGATING GARDENS.					
Sofas, in frame, 1 upholstered					
Sofa, upholstered in green damask					
Matting, cocoa ..... yards					
Extinguishers, fire, Babcock's					
Wardrobe, walnut					
Spring, double					
Carpet, Wilton, red. ..... yards					
Wardrobe, mahogany					
Desk, walnut					
Cabinet, carved, mahogany, tall					
Laces, window					
Mirror, gilt frame					
Rug, green, Wilton carpet					
Hose, ¾-inch, 4-ply ..... feet					
Ladder, hub					
Wringers, for clothes					
Sweepers, carpet					
Hangings, window curtains and draperies, blue silk rep, from Blue Room, pairs.					
Curtains, red velours, from main corridor, pairs.					

***Inventory of public property, Executive Mansion, June 30, 1908*—Continued.**

Voucher.		On hand last return.	Received since last return.	Total to be accounted for.	Disposed of since last return.	Method and date of disposal.	Authority for disposal.	On hand.		Condition, etc.
No.	Date.							Date.	Quantity.	
								1908.		
.....	.....	2	.....	2	1	Sold at auction....	The President ..	June 30	1	Old.
.....	.....	1	.....	1	.....	.....	.....	....do ...	1	Do.
.....	.....	14	.....	14	.....	.....	.....	....do ...	14	Do.
.....	.....	2	.....	2	.....	.....	.....	....do ...	2	Do.
.....	.....	1	.....	1	.....	.....	.....	....do ...	1	Do.
.....	.....	1	.....	1	.....	.....	.....	....do ...	1	Do.
.....	.....	178	.....	178	.....	.....	.....	....do ...	178	Do.
.....	.....	1	.....	1	.....	.....	.....	....do ...	1	Do.
.....	.....	1	.....	1	.....	.....	.....	....do ...	1	Do.
.....	.....	1	.....	1	.....	.....	.....	....do ...	1	Do.
.....	.....	2	.....	2	2	Burned	The President ..	....do ...	0	
.....	.....	1	.....	1	.....	.....	.....	....do ...	1	Good.
.....	.....	1	.....	1	1	Transferred to policemen's lobby.	.....	....do ...	0	
.....	.....	400	.....	400	.....	.....	.....	....do ...	400	Do.
.....	.....	1	.....	1	1	Sold at auction....	The President ..	....do ...	0	
.....	.....	2	.....	2	2	.....do.....	.....do	....do ...	0	
.....	.....	10	.....	10	10	.....do.....	.....do.....	....do ...	0	
.....	.....	2	.....	2	2	.....do.....	.....do.....	....do ...	0	
.....	.....	2	.....	2	.....	.....	.....	....do ...	2	Do.

APPENDIX H H H.

NORTHERN AND NORTHWESTERN LAKES—CORRECTING AND ISSUING CHARTS—SURVEYS—WATER LEVELS—PRESERVATION OF NIAGARA FALLS.

REPORT OF MAJ. CHARLES KELLER, CORPS OF ENGINEERS, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

UNITED STATES LAKE SURVEY OFFICE,
Detroit, Mich., July 28, 1908.

SIR: I have the honor to submit herewith the annual report of the survey of Northern and Northwestern Lakes, and of the operations under the appropriation Preservation of Niagara Falls, for the fiscal year ending June 30, 1908.

Very respectfully, your obedient servant,

CHARLES KELLER,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

H H H 1.

NORTHERN AND NORTHWESTERN LAKES—CORRECTING AND ISSUING CHARTS—SURVEYS—WATER LEVELS.

As early as 1816 local surveys of the Great Lakes for special purposes were made by engineer officers, but the survey of the Northern and Northwestern Lakes as a connected and systematic whole was commenced in 1841 and prosecuted continuously until 1882, when work was suspended, as the data then in hand seemed sufficient for the requirements of navigation of the period. After the suspension and until 1889 operations were limited to the publication and issue of charts, $2,000 or $3,000 being appropriated annually for this work. In 1889 field operations were resumed under an appropriation made therefor, and have been continued under annual appropriations ranging from $5,000 to $150,000. In 1898 these operations were extended to include observations and investigations of lake levels with a view to ascertaining the causes of changes in level, determining the hydraulic data needed for formulating the laws of interlake flow, and devising the most feasible method of lake-level maintenance or regulation.

Operations during the last fiscal year have included work related to the several features above referred to, as follows:

Charts.—The following statement shows the number of charts received and disposed of at this office during the fiscal year ending June 30, 1908:

On hand July 1, 1907	43,004
Received from Chief of Engineers, U. S. Army	7
Prepared in this office	18,614
Returned from office files and from Buffalo office	27
Total	61,652
Sold	17,207
Issued for official use	2,494
Transferred to United States Engineer Office, Buffalo, N. Y	2,665
Destroyed (out of date)	700
On hand July 1, 1908	38,586
Total	61,652

The total number of charts sold by this office during the year was 17,207, the total amount received from these sales being $2,768.36, which was duly deposited to the credit of the Treasurer of the United States. The total number of charts that have been sold, issued, and transferred through this office to June 30, 1908, is 362,293, including issues to the United States Engineer Office at Buffalo.

In continuation of the policy of eventually issuing all Lake Survey charts in colors, of keeping constantly revised to date all charts after their issue, and of preparing such additional coast and harbor charts as the interests of navigation seem to require, work as outlined below has been performed in this office during the year. The revisions of charts embraced changes in aids to navigation, modifications due to river and harbor improvements, latest magnetic determinations, additional and corrected sailing courses, and the most prominent topographic and hydrographic changes developed by commercial and industrial enterprise on the shores of the lakes and their tributary and connecting waters. The changes constantly being made in lights and buoys, pier extension and breakwater construction, etc., render necessary a very large amount of hand work, as every chart is corrected, as far as practicable, for all information received to the day it is sent out of the office.

Copies of charts were revised as above indicated, the copperplates correspondingly corrected, transfers to stone made, color plates prepared, and the charts printed in colors, as follows:

1. Cleveland Harbor and Cuyahoga River; scale, 1:12,000. Third edition in colors (second edition from heliogravure copperplate). Issued July 10, 1907.
2. Agate and Burlington Bays, Minnesota; scale, 1:6,000. Second edition in colors (first edition from Molitor-process copperplate). Issued July 17, 1907.
3. Coast Chart No. 1, Lake Ontario; scale 1:80,000. Chart limits extended to include St. Lawrence River from Wolfe Island light to Round Island. Third edition in colors (from engraved copperplate). Issued July 31, 1907.
4. St. Lawrence River No. 6; scale, 1:30,000. Third edition in colors (from engraved copperplate). Issued July 31, 1907.
5. St. Lawrence River No. 5; scale, 1:30,000. Third edition in colors (from engraved copperplate). Issued August 15, 1907.
6. Coast Chart No. 5, Lake Michigan; scale, 1:80,000. Extensive changes at Calumet Harbor, Illinois, and Indiana Harbor and Gary, Ind., added. Second edition in colors (from engraved copperplate). Issued September 5, 1907.

7. Coast Chart No. 5, Lake Ontario; scale, 1 : 80,000. Niagara River extended to North Tonawanda; Welland Canal added from Port Dalhousie to chart limits. First edition in colors (from engraved copperplate). Issued October 18, 1907.
8. Milwaukee Harbor, Wisconsin; scale, 1 : 12,000. Second edition in colors (from heliogravure copperplate). Issued November 20, 1907.
9. Detroit River (engraved copperplate); scale, 1 : 40,000; with insets of Lower Detroit River (Molitor-process copperplate); scale, 1 : 20,000; and Mouth of Detroit River; scale, 1 : 80,000 (latter newly added by extract from corrected copperplate Lake Erie No. 7). Shows available channels for season of 1908. Seventh edition in colors. Issued January 8, 1908.
10. Straits of Mackinac; scale, 1 : 120,000. Results of recent surveys, including many uncharted shoals, new sailing courses, etc., added. Sanding, lettering, and topography of much-worn engraved copperplate retouched. Fourth edition in colors. Issued March 25, 1908.
11. Coast Chart No. 7, Lake Erie; scale, 1 : 80,000. Extension of ship channel at mouth of Detroit River added. Third edition in colors (from engraved copperplate). Issued March 30, 1908.
12. Ashtabula Harbor, Ohio; scale, 1 : 5,000. Entire rearrangement of breakwaters and railway piers and docks shown. Fourth edition in colors (second edition from Molitor-process copperplate). Issued April 10, 1908.
13. Coast Chart No. 5, Lake Erie; scale, 1 : 80,000. Second edition in colors (from engraved copperplate). Issued April 15, 1908.
14. North End of Green Bay; scale, 1 : 120,000. Results of recent surveys added. Second edition in colors (from engraved copperplate). Issued May 20, 1908.
15. Coast Chart No. 1, Lake Erie; scale, 1 : 80,000. Results of Niagara River surveys added; Welland Canal and feeders extended to chart limits. Second edition in colors (from engraved copperplate). Issued June 3, 1908.
16. Coast Chart No. 2, Lake Ontario; scale, 1 : 80,000; with inset of Oswego Harbor; scale, 1 : 8,000. Chart from engraved copperplate; inset newly added by transfer from Molitor-process copperplate of harbor chart. Second edition in colors. Issued June 5, 1908.

Revisions of copperplates preparatory to new editions of the following charts are in hand:

1. Huron Harbor, Ohio; scale, 1 : 5,000. Ready for transfer for second edition in colors (first edition from Molitor-process copperplate).
2. Conneaut Harbor, Ohio; scale, 1 : 5,000. For third edition in colors (second edition from Molitor-process copperplate).
3. Lorain Harbor, Ohio; scale, 1 : 8,000. Ready for transfer for second edition in colors (first edition from Molitor-process copperplate).
4. St. Marys River No. 2; scale, 1 : 40,000. New West Neebish channel to be shown. For sixth edition in colors (fifth edition from heliogravure copperplates).
5. General Chart of Lake Superior; scale, 1 : 500,000; with insets (Molitor-process copperplates) of Gargantua Harbor, Ontario; scale, 1 : 20,000; Grand Marais, Mich.; scale, 1 : 10,000; Grand Marais, Minn.; scale, 1 : 8,000; and Michipicoten Harbor, Ontario; scale, 1 : 5,000. Recent Canadian surveys of north coast, engraved on stone, to be added by transfer. For sixth edition in colors (third edition from heliogravure copperplates).
6. Coast Chart No. 8, Lake Superior; scale, 1 : 120,000; with insets of Washington and Grace harbors, Todd Harbor, and Rock Harbor, Isle Royal; all to scale, 1 : 30,000. Recent Canadian surveys of Thunder Bay (Molitor-process copperplate) and of coast from Silver Islet to Lamb Island light (new stone engraving) to be added by transfer. For second edition in colors (from engraved copperplate).
7. Lake St. Clair; scale, 1 : 50,000. New channel at St. Clair Flats Canal and recent local surveys to be added. For fifth edition in colors (from engraved copperplate).
8. Grand Island, Lake Superior; scale, 1 : 25,000. Surveys of 1905, 1906 to be included. Changes at Munising to be engraved on stone and added by transfer. For second edition in colors (from engraved copperplate).

The following entirely new charts, engraved on stone, were completed and issued in colors during the year:

1. Munising Harbor, Michigan; scale, 1:8,000. From survey of 1906. Issued July 27, 1907.
2. General Chart of the Northern and Northwestern Lakes; scale, 1:1,200,000. Shows the Great Lakes and rivers, main sailing courses, aids to navigation, lines of equal magnetic variation, comparative annual water-level curves, dry docks and canals, etc. Issued August 24, 1907.
3. Harbors at Ogdensburg, N. Y., and Prescott, Ontario; scale, 1:10,000. From surveys of 1902 and 1907. Issued August 30, 1907.
4. Lake Winnebago, Wisconsin; scale, 1:40,000. From survey made under Milwaukee United States Engineer Office. Issued October 22, 1907.
5. Grand Haven Harbor, Michigan, including Spring Lake and Lower Grand River; scale, 1:15,000. From surveys of 1905, 1906. Issued November 6, 1907.
6. Pine Lake, including Charlevoix, Mich.; scale, 1:30,000; with inset of Charlevoix Harbor; scale, 1:10,000. Inset reduced by heliogravure from harbor chart and added by transfer. Issued June 10, 1908.

In addition to the foregoing, the following new charts are well advanced:

1. Entrance to Green Bay, from Poverty Island Passage to Porte des Morts; scale, 1:40,000. From surveys of 1905, 1906. To be issued about July 15, 1908.
2. Mouth of Saginaw River, including Bay City, Mich.; scale, 1:15,000. From surveys of 1906, 1907. To be issued about July 28, 1908.
3. North End of Lake Michigan, including Green Bay; scale, 1:240,000. From all available data. Engraving completed, ready for verification.
4. Sturgeon Bay, Canal, and Harbor of Refuge; scale, 1:30,000; with insets of Sturgeon Bay (town) and Harbor of Refuge; both to scale 1:10,000. From surveys of 1905, 1906. Engraving completed, ready for verification.
5. Black Lake, including Holland, Mich.; scale, 1:15,000. From survey of 1906.
6. Waukegan Harbor, Illinois; scale, 1:8,000. From 1907 survey.
7. Coast Chart No. 3, Lake Huron (South End of Lake Huron); scale, 1:120,000. First edition in colors will comprise a revision of copperplate chart Foot of Lake Huron, with a new engraving on stone of Canadian shore from Cape Ipperwash to Goderich, the latter forming an inset. The engraving is so projected as to permit of eventual extension round to Harbor Beach when resurveys are available.
8. Cheboygan Harbor, Michigan, and Approaches; scale, 1:12,000. From 1907 survey.

The preceding editions of the following stone-engraved charts having been exhausted, the original stones were corrected and new editions published:

1. General Chart of Northern and Northwestern Lakes; scale, 1:1,200,000. Second edition in colors (first edition issued August 24, 1907, as above mentioned). Issued January 6, 1908.
2. General Chart of Lake Huron, including Georgian Bay; scale, 1:400,000. Second edition in colors. Issued April 15, 1908.

Revisions for new editions of the following stone-engraved charts are in hand:

1. Portage Lake and River, Lake Superior; scale, 1:30,000; with insets of Portage Entry and River and of Upper Entrance and Canal; both to scale 1:15,000. Nearly ready for printing second edition in colors.
2. Coast Chart No. 8. Lake Huron; scale, 1:120,000; with insets of Serpent Harbor, Ontario; scale, 1:30,000; and Little Detroit, Ontario; scale, 1:8,000. Ready for transfer for second edition in colors.
3. General Chart of Lake Erie; scale, 1:400,000. For sixth edition in colors (second edition from stone engraving).

4. Lake Winnebago, Wisconsin; scale, 1:40,000. Ready for printing second edition in colors, for Milwaukee United States Engineer Office.
5. St. Clair River; scale, 1:40,000; with insets of Vicinity of Marine City, Shoals in Vicinity of St. Clair, and Russell Island Shoal, including Algonac and Grande Pointe; all to scale 1:16,000. For second edition in colors.

Two small inset charts, not included in the regular series of Lake Survey charts, were prepared, as follows:

1. St. Louis Bay Cross Channel, Duluth-Superior Harbor, and aids to navigation established September 12, 1907; scale, 1:18,000. Extract from corrected Molitor-process copperplate of harbor chart. Inset in Supplement No. 6 to Bulletin No. 17, issued October 18, 1907.
2. Index Chart of Northern and Northwestern Lakes, showing limits of present Lake Survey charts, with new index numbering. Fifth edition in black and red (second edition from engraved stone). Issued with Catalogue of Charts, June, 1908.

Owing to curtailment of Lake Survey chart production, necessitated by the reduced appropriation for the year, and to avoid disrupting the trained lithographic force, the following work not related to the regular scope of the Survey's operations was performed for the purposes below stated:

(*a*) For the Mississippi River Commission:

Sheets Nos. 24 and 25 of the inch-to-mile series of the Lower Mississippi River and Index Sheet No. 1 of same series were reproduced by photolithography, and 500 copies of each printed in black and red, October, 1907.

A hydrograph form was engraved on stone, and 200 copies printed on paper and tracing cloth, December, 1907.

Maps of Atchafalaya River and of Mouth of Red River were reproduced by photolithography, and 100 copies of each printed in black, January, 1908.

Sheets Nos. 142, 143, 144, and 145 of the inch-to-mile series of the Upper Mississippi River were reproduced by photolithography, and 500 copies of each printed in black, February, 1908.

Sheets Nos. 234 to 242, inclusive (9 sheets), of the 1:10,000 series of the Upper Mississippi River were reduced by photolithography from scale 1:5,000, and 500 copies of each printed in black, February and March, 1908.

(*b*) For United States Engineer Office, Detroit, Mich.:

Photolithographic reductions were made of the series of 16 plates, illustrating the construction of the Poe lock, St. Marys Falls Canal, title-page for same engraved on stone, and 500 copies of each printed in black, except sheet No. 1 (showing location of canal and locks), which was printed in three colors. Twelve photographic views, illustrating progress of work, were reproduced in half-tone on three plates, and 500 copies of each plate printed in black with border in buff. These 20 plates, 500 copies each, constitute the edition of the General and Detail Drawings of the Poe Lock, St. Marys Falls Canal. Completed June, 1908.

Vicinity of Sault Ste. Marie, Michigan and Ontario, showing American and Canadian Canals; scale, 1:15,000. Revised reprint from engraving on stone, for inset in Statistical Report of Lake Commerce through the Canals during season of 1907. Two thousand copies printed in three colors, April, 1908.

(*c*) Under appropriation for Maps, War Deptrtment, 1908, by direction of the Chief of Engineers:

For use of the military division, Department of the Columbia, 250 copies of Map of Alaska and 125 copies of Map of Tanana River, Alaska (latter reduced one-half), were printed in black from photolithographic reproductions, February, 1908.

Map of Defenses of Port Arthur (to four-fifths scale), Map of Japanese Siege Artillery Positions at Port Arthur, and Strategical Map of Part of Korea and Manchuria were reproduced by photolithography, and 400 copies of each printed, the first two in black and the last named in six colors, May, 1908.

Map of Army of the Cumberland was reproduced by transfer to stone from four copperplates received from the Chief of Engineers, and 25 copies of each part printed in black. Campaign Maps of the Army of the Potomac were transferred to stone from three copperplates, and 200 copies of each printed in black. Map of Washington City, D. C., was transferred from two copperplates, and 25 copies of each printed in black. Completed May, 1908.

Map of West Point, Ky., Maneuver Grounds, for use of the Army Service Schools, Fort Leavenworth, Kans., was photolithographed, and 506 copies printed in three colors, June, 1908.

The north half of Map of Region between Gettysburg, Pa., and Appomattox Court House, Va., was engraved on two stones—one for black and one for blue—and 230 copies printed in three colors on thin paper, and 230 copies in four colors on heavy paper, June, 1908.

Four engraved stones of Tonnage Map of the United States, received from the Chief of Engineers, were corrected, transfer made to two stones for printing, and 500 copies of each printed in black and red, June, 1908.

The employment of the lithographing force on the preceding outside work during part of the year and the enforced half-time service during another part of the year, due to limited funds, precluded the production of any new copperplates from stone engravings by the transfer and etching process of Assistant Engineer Edward Molitor. However, in preparation for new editions, work of retouching defects and of roughing and recutting heavy lines and large lettering was done on the following copperplates previously prepared by this process:

1. Northwest Coast of Lake Superior, for Coast Chart No. 8; scale, 1:120,000.
2. Agate and Burlington Bays; scale, 1:6,000.
3. Huron Harbor, Ohio; scale, 1:5,000.
4. Lorain Harbor, Ohio; scale, 1:8,000.
5. Charlevoix Harbor, Michigan; scale, 1:8,000.
6. Oswego Harbor, New York; scale, 1:8,000.
7. Conneaut Harbor, Ohio; scale, 1:5,000.

The original series consisted of 76 charts, all of which were printed from copperplates. As a result of revisions, additions, and cancellations, there are now in force 120 Lake Survey charts, of which 3 are printed in black from copperplates, 69 are lithographs in colors from copperplate transfers, 45 are lithographs in colors from stone engravings, and 3 are photolithographs in colors.

To complete the series of Lake Survey charts, about 25 new coast and harbor charts remain to be prepared from new and existing surveys.

Of the entire series of charts, there had been issued in colors 5 on July 1, 1900; 12 on July 1, 1901; 30 on July 1, 1902; 49 on July 1, 1903; 59 on July 1, 1904; 73 on July 1, 1905; 97 on July 1, 1906; 110 on July 1, 1907, and 117 on July 1, 1908.

The methods of work inaugurated seven years ago, having been proven to be satisfactory and economical, merit a more extended description than has heretofore been given. For this purpose the following account, condensed from a report made by Assistant Engineer Molitor, shows the former state of the art of chart production as practiced by the Lake Survey and the improvements introduced by him.

The simplest method of chart production, and the one which demands the smallest amount of technical service in addition to that usually found in any engineering force, is the method of photolithography, which consists in photographic reproduction of original

manuscript drawings, upon suitably prepared zinc plates. From the zinc plates a transfer is made in the customary manner to lithographic stones, and from these the chart is printed as desired in one or more colors upon the commercial lithographic steam press. The quality of the printed charts depends upon that of the manuscript original, which accordingly must be made by a skilled topographic draftsman; and while work of this character is notably slow and laborious, and the preparation of numerous charts within a measurable and profitable interval after the completion of the field work requires a correspondingly large number of skilled draftsmen, the amount of work and the time required are further increased by the necessity of drawing the original upon a scale 20 to 25 per cent larger than the desired scale of the chart. Where, as upon the Great Lakes, changes in charted conditions are frequent, to save hand correction editions must be relatively small. For new editions originals must be corrected and again photographed. Without inadmissible mutilation and damage, only a relatively small amount of change is possible in such manuscript drawings, and finally, after two or three editions, further reproduction by photography becomes impossible because of discoloration, warping, and breaking of the paper. The repeated photolithographic process has been demonstrated to be out of the question. Its cost is high and its availability but small.

The second method—that of heliogravure upon copper—is one whose application in chart reproduction has been developed by Mr. Molitor. In this method the manuscript drawing, prepared as already described, by photography is reproduced upon suitably coated copperplates, which are etched in the usual manner to make the negative impression upon the copper. This gives a permanent record of reduced scale upon the copperplates, from which charts are printed as hereafter described. Changes, corrections, and improvement of improperly etched lines may be made in the manner usual for copperplate engravings. This method dispenses with the necessity of repeatedly handling original drawings, but is more expensive than the preceding and, moreover, experience has shown that the fine lines, during the etching process, are either lost or made too heavy, so that much hand work is needed to produce plates from which impressions of the desired quality may be had.

Next in order comes the process of engraving directly upon copperplates. With highly trained copperplate topographic engravers—a very limited and high-priced class of artists—it might be possible to compile a chart from the various field sheets and engrave it directly upon the copper without resorting to previous compilation and reduction upon a single manuscript drawing. The Lake Survey has in its employ at least one engraver capable of working in this manner, but because of the pressure needed to secure the proper impression of the engraving tool even this method would be slower and more expensive than the preceding ones, while the more usual method of engraving from a compiled and reduced manuscript drawing would add the cost of the latter work to the already high cost of the slow process of engraving. This method and the preceding one possess the great advantage of furnishing a permanent record, which can be easily stored and readily revised and corrected. Printing the editions from the original copperplate is not admissible, however, on account of wearing

out this record plate, and a resort must be had to electroplates for printing, adding greatly to the cost of this process. Correction of the original and electro is also a double expense.

The method now in use in the Lake Survey has resulted from a recognition of the defects of the previously named methods of reproduction. It is well known that expert lithographers can work much more quickly upon stone than can draftsmen on paper or engravers upon metal. Assuming equally high quality and finish in the resulting work, it is estimated that the lithographer works three times as fast as the draftsman, who in turn is appreciably quicker than the engraver. Accordingly firms doing commercial work involving the use of lettering or vignettes employ lithographers and lithographic stones, with great resulting economy. The drawback to the employment of this process is the size and weight of the stones, which make their storage difficult, and the great scarcity and cost of large lithographic stones suitable for original engravings. These must be of blue or gray color and free from lime spots or quartz veins. Such stones are no longer to be had in the market, and in order to use to the highest advantage the stones of this quality belonging to the Lake Survey it became necessary to develop some method of securing from the directly engraved stone a permanent record on copper or steel plates. With such a permanent record it would then be possible to use the engraving stones over and over again. After much experiment a method has been developed which permits the transfer of the stone engraving to a copperplate. This plate is first thoroughly cleaned, and after the transfer has been made from stone to copper the plate is flowed with a 9 per cent solution of shellac and other gums in alcohol, and after being dried is immersed in turpentine for fifteen minutes. The turpentine dissolves the ink of the design, leaving the background untouched, and finally this design is etched in the same manner as heliogravure plates, using a concentrated solution of chloride of iron. The resulting copperplate may be readily corrected and revised, while the original stones, in addition to their cost, scarcity, and weight, possess the further disadvantage that corrections to only a a very limited extent may be made upon them, since their printing quality is greatly impaired by any disturbance of the even surface of the stone. Accordingly, this method combines the speed and economy of stone engraving with the greater facility of correction, handling, and storage, peculiar to copperplates. This, then, is the method now in use at the Lake Survey for producing and reproducing charts. Its adoption involved the necessity of training in topographic work a sufficient number of lithographers. This has required time and pains, but the success achieved is shown by the quality and the low cost of the charts issued since 1902. Lithographers have been taught to draw directly upon stone from photographic reductions, to proper scale, of the field sheets. Control is furnished by the projection of appropriately spaced meridians and parallels, and speed and accuracy are increased by the use of gelatin tracings of outlines, which are transferred to the stone by applying a colored pigment to the incised lines and rubbing these upon the stone. This system of working permits the easy combination or compilation of adjoining field sheets, which are originally made upon a convenient scale and without much regard to excellence of finish.

What precedes explains the methods of producing the record from which, in some way, the chart must be printed. When photolithography is employed, the transfer from the zinc plates to stone, after customary manipulation by four or five etches to obtain the typed or raised surface, is used for printing in the steam lithographic press. If colors are desired, for each such color a separate stone must be prepared from its corresponding transfer by offset impressions. Printing in this manner permits the use of dry paper and is rapid and economical. When the reproduction is made by heliogravure or by direct engraving upon copper, either the plate itself may be used to produce, by direct printing, black lines upon a white ground, or, by transfer to stone, the lithographic method of printing may be employed. Printing direct from copperplates is very slow and expensive because, owing to the fact that the lines are incised, the plate must be inked and wiped very carefully by hand for each impression, while, to enable the paper to take the ink, it must be dampened, and this leads to uncertain shrinking and vitiates scales. By taking a transfer from the the copperplate on special transfer paper free from distortion and applying it to stone the accuracy of the resulting chart is preserved, while the cost of printing the equivalent black impressions (for an edition of, say, 500) is about one-tenth that of printing from copperplate; and the copperplates used in this way are not worn out by repeated use for printing, but may be preserved indefinitely. Printing from a lithographic transfer offers further advantages. While the topography and hydrography of any chart are subject to relatively slight changes, which may readily and at small cost be made upon the copper record, much subsidiary and explanatory matter which is common to all the charts—such as titles, authorities, notes, sailing directions, magnetic variations, compass roses, etc.—requires frequent change. It is a saving of time and money to record and preserve this matter upon small stones from which appropriate extracts and transfers are made as required. This saves about one month in the preparation and publication of each new chart and further enables old and nearly worn-out copperplates of the original Lake Survey charts to be economically revised, brought to date, and used; for the transfer may, by skillful manipulation in the inking and rolling, be made to produce a much sharper impression than the worn copperplate original.

Accordingly, new charts are now engraved on stone, transferred to other stones for printing, and are subsequently reproduced on copperplates for permanent record. From these copperplates new editions, as needed, are printed by lithographic transfer. The paper for an ordinary chart costs about 3 cents, and the printing, including transfer to stone and preparation of two to four color stones, costs about 12 cents, making the total cost of the average chart 15 cents; at which price, under the law, most of the Lake Survey charts are now sold.

The adoption of colors for the Lake Survey charts has added slightly to their cost. The reason for the adoption and for the use of the strongly contrasted colors actually employed was to enable such navigators as were unaccustomed to, and perhaps somewhat prejudiced against, the use of charts to discriminate readily between land and water areas, and to distinguish easily channel lines and aids and obstructions to navigation. The strong colors used permit the charts to be read at a glance. As a result of their cheapness and

clearness, no vessel on the Great Lakes is now without them, and masters who formerly depended on memory and local landmarks now employ the charts.

The reduction, preparation, and reproduction of charts has continued, as hitherto, under the immediate direction and supervision of Assistant Engineer Edward Molitor, to whom great credit is due for the quality and quantity of work done.

Surveys.—At the beginning of the fiscal year three parties were in the field, as follows:

Junior Engineer A. J. Swift, with a party on the steamer *Col. J. L. Lusk*, was engaged in sounding and sweeping east and south of Colchester light in the west end of Lake Erie, with a view to widening the safe water area bordering the main vessel course. This party remained in the field until November 2 and in its operations covered 77 square miles and found five uncharted shoals and wrecks.

Assistant Engineer F. G. Ray, with a party on the steamer *Search*, was engaged in sounding and sweeping an important part of the Straits of Mackinac, extending east from Manitou Paymen shoal and through the south channel. The party remained in the field until November 17, 1907, covered 205½ square miles, and found seven new or badly charted shoals. As a result, it became necessary to move the vessel course a mile to the north.

The third party, under Junior Engineer M. S. MacDiarmid, on the steamer *No. 1*, was engaged in harbor survey at St. Joseph Harbor, Michigan. After various surveys, it closed operations on October 27.

A more detailed account of these operations is found in the following extract from the annual report of Principal Assistant Engineer Francis C. Shenehon:

At the beginning of the fiscal year three parties were in the field engaged in the following work: The continuation of the careful examination of lake areas adjacent to the main steamer track at the west end of Lake Erie, the completion of the sweeping off Thunder Bay Island on the main steamer track in Lake Huron, and the survey of the harbor of St. Joseph, Lake Michigan.

Survey of the west end of Lake Erie.—This work had been assigned to the steamer *General Williams* (since renamed the *Col. J. L. Lusk*) and was in charge of Junior Engineer Andrew J. Swift, who, having left Detroit on May 15, 1907, had already executed considerable valuable work in the interest of safe navigation by the end of June, as detailed in my report of last year. At the beginning of the present fiscal year, sweeping operations were in progress directly on the vessel tracks taken by heavy Detroit River tonnage and on adjacent areas to the southward and eastward of Colchester reef.

This work, as well as the work subsequently to be described on Lakes Michigan and Huron, has been characterized by the extensive and successful use of the long-wire sweep, and marks the accomplishment of a revolution in hydrographic methods. This is even more significant than the large number of important discoveries of obstructions to navigation revealed by its use.

The control of the surveys of this season was accomplished by the earlier triangulation, with the exception of one station established on the west shore of Pelee Island and denominated A Road. All soundings and areas swept were accurately located by sextant readings on three signals, and these signals, following the precedent of prior years, were mostly flagged spar buoys. Sounding accompanied the sweeping, and was done with the 95-pound cast-iron weight on piano wire.

The hydrographic work accomplished after the beginning of the fiscal year, July 1, up to the end of the field season, November 2, embraced 62 square miles of sweeping and sounding, an additional 15 miles sounded, but not swept, and a harbor survey of Put-in-Bay.

The assurance of a clear waterway in these 62 square miles swept is of much value, and the location of the following obstructions fully justify the examination:

(1) Hen Island shoal, discovered in the closing days of the previous fiscal year and reported last year as "a 24-foot spot north of Hen Island," proved on further development to be a gravel shoal about a half mile across on the 24-foot contour, with a least depth of 18.3 feet on the crest. It is surrounded by 33 feet of water.

(2) An uncharted rock and gravel mound with a least depth of 24 feet was discovered, with its center seven-eighths mile west of Hen Island. It is over 1,600 feet long and about 300 feet wide, stretching east and west. It is surrounded by 32 to 33 feet of water.

(3) A small spot showing a least depth of 21.4 feet was discovered 3,380 feet N. 31° W. (azimuth 329°) from the north end of Harbor Island. This is of little moment to navigation.

The revelation of the menace created by the wrecks lying on the floor of the lake, even though leveled to what might have been a satisfactory clearance in years past, is somewhat startling.

(4) An examination was made on August 1 of the wreck of the schooner *Armenia*, sunk directly on the vessel track from Pelee Passage to Detroit River, 3½ miles N. 54° W. (azimuth 306°) from Pelee Passage light. The position of this vessel was well known, and it had been lighted earlier in the season and supposably leveled to a safe clearance. The examination showed least depths of 20.2, 22.7, and on one spot 12.2 feet. No light was displayed on this wreck at that time.

(5) On the last day of August a lone spar reaching up from 33 feet of water to within less than 8 feet of the surface was discovered 2¼ miles S. 56° E. (azimuth 124°) from Colchester light-house. It is directly on the course of vessels passing Colchester reef on the south.

(6) On September 7 an unknown wreck was encountered lying on the lake floor in 34 feet of water 2 1/16 miles N. 66° 10′ E. (azimuth 66° 10′) of Colchester light-house and close to the track of the through carriers from Detroit River to lower Lake Erie ports. Sweeping showed 20.7 feet of water over it.

(7) During the same month the wreck of the steamer *Grand Traverse* was found, out of its charted position, 1⅛ miles N. 7° W. (azimuth 353°) from Colchester light-house. This wreck lies in 31 feet of water, and showed least depths of 19 to 20 feet. It is on the main track between Detroit River and Pelee Passage for vessels taking the north side of Colchester reef. It is not improbable that this wreck is the obstruction that vessels have reported in this region.

It must be borne in mind that an obstruction, wreck, or shoal covered by 24 feet of water is in times of storm a menace to 20-foot navigation.

(8) The wreck of the schooner *Magnet*, known to rest 3 miles N. 60° E. (azimuth 60°) from Middle Sister Island, was examined and found to have a clearance of 24.7 feet over it.

On all these wrecks buoys were placed displaying flags.

All depths here given refer to standard low water, 569.91.

In addition to the important hydrographic work accomplished this party made topographical surveys of small extent at Put-in-Bay, Middle Sister Island, North Harbor Island, and of changes at Kingsville, Ontario, since 1904.

The work executed by this party is commendable, not alone from the fact that considerable areas were covered and results shown, but because in addition this was wrought with the handicap of a small force and an equipment not adequate. Instead of a fleet of three launches this party had one, with a kerosene motor not designed for the work in hand; instead of a sweep half a mile in length, the sweep was less than half that length, and the details were still crude. Mr. Swift and his party are therefore entitled to more than perfunctory commendation for an accomplishment when funds were too low for effective appliances. The results of these surveys were embodied on the sheets of the survey of 1903 and 1904, scale 1 : 20,000, and on two new sheets, scale 1 : 20,000, and the harbor survey of Put-in-Bay on a sheet 1 : 5,000.

Surveys in Lakes Huron and Michigan.—The party on the steamer *Search*, under Asst. Engineer F. G. Ray, was about completing the survey, brilliant in results, off Thunder Bay Island when the fiscal year began. The results of this survey were the discoveries of the wreck and bowlder mound, both dangerous menaces, on the track of the through freighters on Lake Huron, noted in my last year's report. The results were embodied in a tracing sheet on a scale of 1 : 2,000.

Upon the completion of this work the *Search*, on July 3, proceeded to the Straits of Mackinac to take up the surveys of the straits and of the approaches in the north end of Lake Michigan and Lake Huron.

The work in this region involved such tertiary triangulation as it was necessary to interpolate for the intimate control of topography and of hydrography. Westward from the straits to Manitou Paymen shoal the single line △ Manitou Paymen–△ Point aux Chenes, of the 1854 triangulation, sufficed. Throughout the South channel a new system of secondary triangulation, based on the line △ St. Ignace–△ East Base, was projected. Permanent marks were not established, but instead, temporary hubs on the beach targeted with flags. Positions are referred to standard datum. Wherever possible, stations were referenced, and the system itself is made useful and permanent by the inclusion of six prominent points, such as light-houses, in the vicinity of Cheboygan. On the easternmost station, at Cordwood Point, a check was secured by a reading on Spectacle reef light-house, which shows the azimuth to close within five to seven seconds of the computed azimuth derived from the geodetic positions of the two points.

The azimuth of Cheboygan River range lights was determined as 212° 44′.

The topography extended along 67 miles of shore line, and embraced the harbors, towns, and outlying settlements of Mackinaw, St. Ignace, and Cheboygan, with radiating roads and railroads. The transit and stadia method of work was used with closed circuits.

In hydrography the utilization of the long-wire sweep was much more limited than that of the *Lusk* party in Lake Erie, for the reason that much of the water area was deep. Offshore sounding was mostly on a gridiron development, with parallel lines 1,000 to 2,000 feet apart. All sounding work was read in by sextant, using signals located by triangulation or traverse. In offshore work the sounding reel with 95-pound cast-iron weight on piano wire was used.

Inshore work was done with lead, the sounding lines being 400 or 500 feet apart.

The long-wire sweep was used on all offshore areas showing 40 feet of depth or less. It was accompanied by soundings to develop contours.

Seven discoveries of moment were the results of the work in this region, as follows:

(1) A lone bowlder on the 30-foot lake floor, showing only 18 feet of water over it, lies seven-eighths mile SE. ⅞ S. (azimuth 144° 51′) from Manitou Paymen shoal nun buoy.

Azimuths are true with north as zero, and depths are below standard low water, 578.51.

(2) A bowlder reef about half a mile long and 1,000 feet wide, extending from southeast to northwest, a mile and a half southwest of the mouth of Brevoort River, with least depth of 16.5 feet.

(3 A bowlder reef extending about 2 miles westerly from Point aux Chenes, showing depths on pinnacles, 15, 16, 18 feet, etc.

(4) A shoal of ledge rock, 500 feet across, with a crest depth of 17 feet, lying 2½ miles northwest of St. Helena Island.

(5) A shoal of hard gravel, about 500 feet diameter, 1⅝ miles northeast of Cheboygan crib light-house, with a least depth of 14.5 feet.

(6) A small rock and gravel shoal, 1⅝ miles N. ⅛ E. (azimuth 1° 24′) from Cheboygan crib light-house.

(7) An irregular rock reef about three-fourths of a mile long, lying ENE. and WSW. (azimuth 67° 30′), with a width of one-fourth of a mile, whose center lies 2½ miles ESE. (azimuth 112° 30′) of Poe reef light-ship, with a least depth of 20.3 feet.

Taken in connection with the wreck and bowlder mound discovered in June off Thunder Bay Island, the season's work of the *Search* is remarkable. On account of the shoals discovered off Cheboygan, it was necessary to change the sailing course for deep-draft vessels a mile to the northward. The hydrographic examinations of the region centering on the straits covered an area of 202 square miles, of which 17⅓ square miles were swept. The records of the Mackinaw City self-registering water gauge were used to reduce soundings to standard plane.

Work in the straits was suspended November 4. Mr. Ray was detached at this time to proceed to Marquette on gauge inspection, and the *Search*, in charge of Junior Engineer W. H. Vandeburgh, started for Detroit. En route an area in the vicinity of White Rock, 9 miles south of Harbor Beach, defined by a report from the commander of the U. S. S. *Morrill*, indicating an obstruction, was swept, to the extent of 3⅝ square miles. Nothing more serious than a few fish stakes was found, and these were close to shore. The *Search* reached Detroit on November 17, and went into winter quarters at Fort Wayne.

The season was an unusually unfavorable one for hydrographic work. Fifty-seven days are reported when it was impossible to work in the open lake by reason of wind, rain, or fog. With a crew kept small by lack of funds, the accomplishment of Mr. Ray and his party is worthy of the highest commendation.

The results of the surveys were plotted during the winter season on six sheets, as follows:

Four sheets, topography and hydrography from vicinity of Manitou Paymen shoal, Lake Michigan, to the vicinity of Poe reef, Lake Huron; scale, 1:20,000.

One sheet, harbors at St. Ignace and Mackinaw, Mich.; scale, 1:10,000.

One sheet, harbor of Cheboygan, Mich., and vicinity; scale, 1:10,000.

Survey at St. Joseph and Benton Harbor, Mich.—The third party, under Junior Engineer M. S. MacDiarmid, on the small steamer *No. 1*, had left Detroit on May 23, and had completed the survey of South Haven Harbor and had then begun work on that of St. Joseph and Benton Harbor.

To control this latter survey a base line was measured with a steel tape on the Pere Marquette Railroad track between Benton Harbor and St. Joseph stations, and from this a system of triangulation was expanded to embrace both cities. The geodetic positions were computed from the position of the Congregational Church at St. Joseph, as given in the 1902 report. Transit traverses were interwoven with the triangulation net, and the stations established were plotted on the field sheet as the fixed locations for plane-table work. This method was deemed more facile for the local conditions than the customary method of three-point locations from signals.

Between July 4 and August 31 dry docking the steamer for a new wheel, the location of a shoal, and the search for a second described below, interrupted the work of the party and split it up for part of the time.

During the first ten days in September the survey at St. Joseph and Benton Harbor was completed. The survey, in addition to the hydrography of the lake covering an area of 5 square miles, and the St. Joseph River, embraced all local topography needed for a complete navigators' chart, 4½ square miles in area.

Survey of Reed shoal off Grossepoint.—On July 5, as the party on steamer *No. 1* were leaving Benton Harbor to take up the search for the shoal where the steamer *James H. Reed* had stranded in May, the wheel struck a submerged pile and lost a bucket. She proceeded on her own steam to Chicago, dry docked, and had a new wheel put on. While the steamer was under repairs the party proceeded to Evanston by rail and located by a rapid triangulation such signals as were needed in the survey of the area in suspicion. The steamer was out of dry dock on July 15, and on the 16th to 18th the sounding was completed.

An area of 4 square miles was sounded, resulting in the discovery of a rocky shoal showing 13.5 feet depth at standard low water.

Search for the Morse shoal.—Captain Whitney, of the steamer *Samuel F. B. Morse*, having reported shoal water in mid-lake east of Grossepoint, the party on steamer *No. 1* was delegated to make a reconnaissance of the area which seemed to be involved. The area first examined is 10 miles long (east and west) and 8 miles wide, and has its northwest corner 10 miles east of Grossepoint light. This area was gridironed with north-and-south lines a half mile apart between July 20 and August 3. No water of less depth than 70 feet was found. Locations of soundings in this area were for the most part by compass and log. Between August 8 and 31 east-and-west lines on first block one-fourth mile apart were run, and a second block of same dimensions as first, lying adjoining and to the north of it, but offset 2 miles to eastward, was patrolled with a sounding weight at 70 feet depth. This resulted in no discovery.

As the area reported as shoal by Captain Whitney was very extensive, it is probable that the location of the *Morse* was not quite definitely apprehended.

After completing this work the survey of St. Joseph and Benton Harbor was concluded, as before noted.

Relocation of stations and triangulation at south end of Lake Michigan.—On September 10 the party on the steamer *No. 1* proceeded to Michigan City, Ind. With the fall storms at hand it was deemed more economical to employ this party in such shore work as would count in advancing the general survey of the south end of Lake Michigan, to embrace the area south of the parallel cutting the Grossepoint light. It was desirable to locate two adjacent and intervisible stations of the triangulation of 1874 as an initial base for water tri-

angulation projected to extend, following the bow of the shore line, to the vicinity of Waukegan, where a terminal base between two old stations would make the water triangulation simply a connecting web between known positions.

It was hoped to be able to locate the old stations Bald Tom, Michigan City, and Millers. Mr. MacDiarmid's explorations, however, disclosed the fact that no monuments of these stations were intact. The stations had been located on the crests of sand hills, and the blowing off of the sand had caused the monuments to become dislocated and lost.

A provisional location of △ Bald Tom was determined from a section-post monument, originally read in from △ Bald Tom. This, however, was not satisfactory as a geodetic position. A piece of boiler pipe 7 feet long was set in an eccentric position about 7 meters from the true position, as adjudged. At Michigan City but one secondary point—the Deutsche Evangelical Church—out of three remained. A provisional station was established on a sand hill west of Michigan City, whose geodetic position would depend on the Deutsche Evangelical Church, and would, in conjunction with Bald Tom, form the desired base. An observation on circumpolar stars was made for azimuth.

On September 19 the party proceeded to Waukegan, Ill., having in view a harbor survey of this place, and at the same time the relocation of all available stations of the old triangulation, and the extension of this triangulation to the lake front to serve as the terminal base of the water triangulation before noted.

Stations Benton, Warren, and Fremont were relocated, but no monuments or references of stations Antioch or Deerfield were found, although it is thought the subsurface marks may still be intact.

At Waukegan the two original secondary points, dome of court-house and spire of Presbyterian Church, had been destroyed in rebuilding. To use any two of the primary stations as a base would have required the erection of high towers, and as it seemed advisable to avoid this in hopes that the location of the unfound stations with the assistance of a tertiary net would make a more economical solution, a 2-mile base line was measured along the Chicago and Northwestern Railway track just west of the station of Warren. An observation for azimuth was made and a system of triangulation was executed, depending upon this azimuth, the base line, and the geodetic position of △ Warren. It comprised the occupation of seven stations and involved five triangles. The location by this triangulation of the new court-house at Waukegan and the tower at Fort Sheridan gives the base on the lake front desired as a terminal for the system of water triangulation contemplated.

Survey of Waukegan Harbor.—While the triangulation described above was in progress a topographic and hydrographic survey of the harbor and vicinity of Waukegan was made by the plane-table method, embracing 2¾ square miles of shore work and 4½ square miles of soundings.

On the completion of these surveys the steamer *No. 1*, on October 14, proceeded toward Detroit, inspecting water gauges on the way.

To summarize the work of the period between the 1st of July and the middle of October this party made soundings and hydrographic examinations covering approximately 175 square miles, locating one new shoal, topographical surveys covering more than 7 square miles, besides the triangulation at Michigan City and Waukegan to Fort Sheridan. The creditableness of the work of this small party shows upon the face of the record, and Mr. MacDiarmid is entitled to specific mention for his energy and skill.

The results of the surveys of the season are shown on five sheets, as follows:

(1) Surveys at South Haven; scale, 1:5,000.
(2) Surveys at St. Joseph and Benton Harbor; scale, 1:5,000.
(3) Surveys at Waukegan; scale, 1:5,000.
(4) Survey of the Reed shoal; scale, 1:5,000.
(5) Area covered by search for Morse shoal; scale, 1:40,000.

Survey on Lake St. Clair.—A rapid survey was made by Asst. Engineer Thomas Russell in August, 1907, of the shore line from Walkerville to Tecumseh, Ontario, sketching in new features of topography.

Office work.—During the winter season the reduction of the large amount of data was completed. In addition, much work was done on special subjects.

A systematic method of filing the office records relating to surveys was worked out by Junior Engineer Andrew J. Swift. The devices and methods used will be the subject of a special report to be submitted at an early date. The whole lake region is divided up into quadrangles, and all drawings which show areas in a particular quadrangle are listed and described on the stand-

ard 8 by 10½ inch index card pertaining to that quadrangle. The scheme adopted purposes to utilize the vertical-arc filing case, of my own invention, for drawings.

About 500 of the earlier sheets of the office, from 1841 to 1871, have already been trimmed, in some cases patched or mounted, inclosed in filing envelopes, and recorded on index cards. Another winter, with the field men available to continue this work, will complete it. To facilitate the use of the records this work is highly important.

All notebooks, sketching folios, computation books and folios, gauge records, drawings and prints from various sources, and other office records are to be indexed by the same system. The task is a large one.

A table of 117 compass-testing ranges, for the use of masters in keeping a record of their compass deviations, was prepared by Asst. Engineer Thomas Russell, and incorporated in Bulletin No. 18.

A conversion table to reduce points of the mariner's compass to degrees of azimuth, with zero at north, was prepared. This is intended to assist in cultivating among vesselmen the use of degrees instead of points, as tending to put navigation on a simpler basis. The table is printed in Bulletin No. 18.

An elaborate series of distance tables has been computed by Assistant Engineer Russell, but not yet published. Mr. Russell has also done much work on reduction of triangulation and magnetics.

Some considerable work has been in progress on designs for improvements in the details of the long-wire sweep. A new device for recording depths on the sounding reels using 95-pound weights was designed by Assistant Engineer Ray. These were built and placed on the reels of steamers *Lusk* and *Search*.

Steamers.—The breaking of the wheel of the steamer *No. 1* in the harbor of St. Joseph has already been noted. A new wheel was put on her and some repairs, including a small amount of calking, were made while she was in dry dock. During the spring of 1908 the engine and boiler of this steamer were taken out of her at Fort Wayne, preparatory to a thorough overhauling of her oak hull to renew certain timbers known to be unsound. To anticipate a little the new year, this work was done in the early days of July, 1908.

Steamer *No. 2*, rebuilding, has had some small amount of work done on her. The lateness of the passing of the sundry civil bill made the need of this steamer in the work of 1908 somewhat problematical, and the work has not been rushed.

Just before the *Search* left Cheboygan, her propeller turned up a deadhead log in the river and broke off a bucket. She reached Detroit on her own steam. In May, 1908, she was docked and a new brass propeller of slightly larger diameter was put on her. While in dock, some additional repairs were made to the stern bearings and rudder. Some repairs were made to the engine, windlass, boiler, hull, and rigging of the *Search*.

The *General Williams*, before going into commission in 1908, was rechristened the *Col. J. L. Lusk*. No repairs of any moment were required on this steamer.

The *Surveyor* was not in commission, and can not be used until extensive repairs to hull, boiler, and engine have been made.

Accident.—On July 25, Jerry Pond, a deck hand residing at St. Ignace, Mich., fell over the rail of the *Search* into the lake and, not being able to swim, drowned before aid could reach him. No negligence on the part of the master or crew attaches to this unfortunate occurrence.

Assistants.—During the year, or part of it, the following technical assistants have been engaged in the survey work:

Asst. Engineers F. G. Ray and Thomas Russell.

Junior Engineers Andrew J. Swift, M. S. MacDiarmid, Sherman Moore, Ira C. Sunderland, W. H. Vandeburgh, Otto S. Zelner, W. S. Richmond, Isaac De Pagter.

Recorders Fred Lockwood, E. O. Mann, George W. Hamill, R. S. Swinton.

Cordial acknowledgment is due to these assistants for efficient service.

Owing to unfavorable weather and to lack of funds, the field parties were late in opening the season of 1908. Two parties are now in the field.

Junior Engineer Andrew J. Swift is in charge of a party upon the steamer *Col. J. L. Lusk* (formerly the *General Williams*), and is engaged in sweeping and sounding in the Manitou Passage, Lake Michigan, near Sleeping Bear Point, where an accident to the steamer

Elbert H. Gary (belonging to the Pittsburg Steamship Company), and other less definite reports have led to the belief that uncharted shoals exist in close proximity to the vessel track generally used by all vessels bound to and from the large ports of the south end of Lake Michigan. The accident to the *Gary* was a costly one and led the Lake Carriers' Association to close the Manitou Passage to vessels belonging to the association. It was accordingly important to investigate the reported obstructions, to verify or correct the charts, and finally to reopen this shorter and more convenient route to navigation. The wire sweep offered a most reliable and economical means to this end. Up to July 1 an area of 21.2 square miles had been swept; and, to anticipate another year's report, early in July a bowlder mound showing 17½ feet of depth (at standard low water), and lying square on the sailing course, was discovered, fully justifying the examination.

The second party, under Assistant Engineer F. G. Ray, on the steamer *Search*, is charged with the survey of the very important area at the south end of Lake Michigan to the southward of the east-and-west line through Grossepoint, Ill. This area includes Chicago, South Chicago, Indiana Harbor, and Gary, and during normal years is the scene of a large and important traffic, possibly without equal elsewhere upon the Lakes. The shore is almost entirely of light and unstable sand, and the charts, which depend upon surveys made in the early seventies, are known to be inaccurate, due to natural and artificial changes. The necessity for accurate charts in this locality is readily apparent. Uncharted shoals have been reported, one of them in a region of supposedly great depth.

Work was begun by the extension of control triangulation from the primary stations near Michigan City to the lake shore, where a base was established and the control extended westward to Wolf Lake by means of *water triangulation*, a method briefly described in the Annual Report for 1905, pages 2786–2787. Hydrographic work was begun at Indiana Harbor and will extend eastward to Gary, this being the area most in need of prompt investigation, and westward to Chicago. Up to June 30 this party had sounded and swept 22 square miles.

During May a hasty reconnaissance of the west shore of Lake St. Clair was made for the purpose of incorporating in a new edition of the chart of this lake the large number of changes in roads, landings, etc., which have been recently made there.

A full account of the work of 1908 up to July 1 is contained in the following extract from the annual report of Principal Assistant Engineer Francis C. Shenehon, to whose energy and ability great credit is due:

Fitting out for season of 1908.—In anticipation of getting into the field by May 1, or earlier, the work of fitting out the steamers was begun in the middle of March; but the backwardness of the season, resulting in the maintenance of ice fields, held back the starting of the steamers, and it was May 18 when the *Search* and the *Col. J. L. Lusk* left Detroit.

Survey of south end of Lake Michigan.—In order to accelerate the work in the south end of Lake Michigan, it was advisable to get as much triangulation accomplished in advance of the arrival of the steamer *Search* as would permit the immediate entrance of the steamer into the work of water triangulation on her arrival at Michigan City. As the work done by Junior Engineer MacDiarmid in 1907 was not sufficient and not entirely determinant, it was decided

to make a search for some of the stations of the primary triangulation in the region back of Michigan City.

Junior Engineer W. H. Vandeburgh on April 28 proceeded by rail to Michigan City to initiate this work. On May 20 Junior Engineer M. S. MacDiarmid joined Mr. Vandeburgh, and when the *Search* arrived, on May 24, to take charge of all operations the necessary base had been secured on the lake front. Mr. Vandeburgh relocated the stations Springville and Otis of the 1874 triangulation. As these stations could not be used as a base without the erection of high towers, it was found advisable to use the line Otis–Deutsche Evangelical Church, and the 6½-mile base along the shore west of Michigan City was established by building only three 12-foot stations. In the angle reading Mr. MacDiarmid and Mr. Vandeburgh collaborated.

Under Assistant Engineer Ray's direction the water triangulation had been carried westward 41 miles to the mouth of Wolf River, 4 miles west of Indiana Harbor, by June 4. No check on the precision of this work has yet been made, but it is intended to tie the work to some primary north of Chicago.

Since June 5 the hydrographic work in the region in the approach to Indiana Harbor has been accomplished by the use of the long-wire sweep, with supplemental soundings to establish contour lines on the many shoals. The surveys show a shoal with 19 feet of water more than 5 miles to the northeast of the harbor entrance. The sweeping accomplished during June covered 22 square miles, and the results are extremely satisfactory and valuable. An advance sheet of the conditions in the area examined has been nearly completed for use in correcting the charts of this region.

Considerable shore-line topography has been taken on stormy days.

Survey of approach to Rogers, Mich.—The steamer *Col. J. L. Lusk*, which left Detroit for the Manitou Passage on May 18, stopped on the way long enough to make a survey of Lake Huron in front of Rogers. The approach was swept and sounded, and the results were plotted on a special sheet, scale 1:5,000, and submitted by Junior Engineer Swift in a report dated May 26, 1908.

Surveys in Manitou Passage, Lake Michigan.—On May 25 the steamer *Col. J. L. Lusk* arrived at the Manitou Passage, and during the remainder of the month was engaged in the preliminary operations of setting and reading in of sextant signals. The prior triangulation sufficed for the survey.

Sweeping began on the area off Sleeping Bear Point on June 1, and by the end of June 21.2 square miles had been swept and simultaneously sounded. This embraces the irregular area of this point lying between the 20-foot inshore contour and the 30-foot contour. The long-wire sweep was used in this work.

It is extremely satisfactory to be able to report that early in July the obstruction which had blocked the Manitou Passage was located and found to be a mass of bowlders showing a least depth of 17½ feet at standard low water. It lies directly on the sailing course for through freighters and is a dangerous menace. A knowledge of its exact location permits the opening again of the Manitou Passage with a new sailing course laid down a mile to the westward; and this result of the survey is of much importance to navigation.

On days when the lake was too rough for hydrographic work, shore-line topography was taken over a reach of about 6 miles from Sleeping Bear Point to 3 miles east of Glen Arbor. A connection was made with the survey of Glen Lake of the Ann Arbor University practice work.

Survey of west shore of Lake St. Clair.—In May, 1908, Assistant Engineer Thomas Russell made a rapid survey of the changes in topographical features along the shore of Lake St. Clair from Milk River Point to the city of Mt. Clemens.

Expansion of Lake Survey.—At the close of the year the adoption of a general project for the completion of surveys on the Great Lakes, and its indorsement by Congress by appropriating the amount estimated for the first installment, has caused increased activity toward getting all elements of equipment in such condition as will yield the best and most economical results.

The field methods employed by the Lake Survey are the result of years of experience and, so far as known, do not differ materially from those employed elsewhere. The use of the tension-wire sweep is, however, an exception, and a brief account, illustrating the details

of the apparatus and setting forth its possibilities and limitations, may be desirable. This sweep was originated by Assistant Engineer Francis C. Shenehon, of the Lake Survey, on the St. Lawrence River in 1902, and was further improved and used by him on Lake Erie in 1903–4. An illustrated description of the sweep as employed in 1902 is found on pages 2763–2764 of the Annual Report for 1903. The sweep, in substantially the same form, seems to have been adopted by the Coast and Geodetic Survey, and an illustrated description will be found in the Annual Report of the Coast Survey for 1905, Appendix 6, which distinctly acknowledges the source of the device. Its later form, as used by the Coast Survey, is shown in Appendix 7 of the Annual Report of that Survey for 1907.

The field season of 1907 was rendered notable by the greatly extended and profitable use of the sweep, and the programme for the present season contemplates further and more extensive development. The following account by Principal Assistant Engineer Shenehon fully explains the details of the use of the submerged, buoyed, and weighted tension wire as a means for covering in a single operation an area in which shoals or obstructions are believed to lie. In 1907 a single day's sweeping covered almost 3 square miles, and, as explained by Mr. Shenehon, it is now expected that this maximum performance will be trebled.

The development of the long wire sweep has grown out of the need of a positive method, because every hydrographer who has been engaged in the examination of ocean, lake, or river areas to insure their navigability as roadways for deep-draft vessels is aware of the futility of soundings as a guaranty that the channels are unobstructed and clear.

It must be borne in mind that sounding with a lead line or a pole gives definite, absolute information of the depths only at a number of isolated points, while the configuration of the bottom must be surmised and the depths interpolated between these points. The justification of a hydrographic examination by soundings of this kind rests on the proposition of the continuity of the slope or curvature of the bottom. Where the bottom formation is such that reefs or bowlders may rise abruptly, the fatuity of this method of *point* soundings is so apparent that it becomes unprofessional to attempt it. Despite this palpable fact, it is not too much to say that most of the navigators' charts of the world are based on lead-line soundings.

The Lake Survey, since 1901, has sounded by an improved method, using a 100 or 140 pound spindle-form, or projectile-shaped, cast-iron weight, designed to slip easily through the water when traveling at 5 miles an hour. This weight is carried by slender piano wire leading from a reel, and the weight is raised between soundings just enough to clear the bottom, and any obstruction existing between soundings is indicated. This method of sounding as used on the lower St. Lawrence River is described in the report of 1901, page 2781, and an illustration of the sounding reel and weight, as used later, is given opposite page 2686 of the report of 1903.

This form of sounding is an integrating method of bottom examination to the extent that certain exact information is gained of the navigable capacity of the waterway at *all* points of the line traversed. This method of hydrographic examination, since it develops a *line*, as opposed to lead-line or pole sounding, which develops merely *points*, may be called *line* examination. The recent invention of the bathometer by Mr. E. S. Wheeler, member of the American Society of Civil Engineers, makes possible the delineation on continuous paper of the profile of the bottom. This method of *line* examination gives more detailed information than the method used by the Lake Survey up to the present time.

There is, however, in any method of *line* examination of a navigable way the same inherent defect, though lessened in degree, as exists in *point* examination, and this is that obstructions lying between the sounding lines are not revealed. By sounding on parallel lines close together, with a second system of parallel lines at right angles to the first system, and a third system of

parallel lines diagonally across these, an area may be so finely divided up that there is little *probability* of obstructions remaining undiscovered. However, the examination by these many lines gives a result on which the area may not be predicated as *absolutely clear;* the evidence shown by the sounding lines is presumptive only, and it may be predicated that the area is *probably* clear and navigable.

If the area considered above is a square mile in extent, and in each system the sounding lines are 100 feet apart, the travel of the vessel making the soundings is over 160 linear miles, and if the speed is 5 miles an hour the work will take 32 hours, or 4 days. Such a method of examination is therefore *expensive* as well as indeterminate.

In the surveys of the past season two obstructions, at least, were discovered that would stand small chance of being revealed by such a minute sounding examination as described above. One was the 10-foot bowlder, resting in 30 feet of water nearly a mile southeasterly of the buoy marking the Manitou Paymen shoal in Lake Michigan, discovered by the steamer *Search* while sweeping. The second was the lone spar, rising 25 feet from a level bottom with 33 feet of water, southeast of Colchester light, Lake Erie, discovered in sweeping by the steamer *General Williams* (now *Col. J. L. Lusk*).

In discussing hydrographic examinations it seems advisable to lay much stress on the fact that sounding, where it is minutely done, is costly and in the end lacks the certainty in its results, warranted by the expenditure required by the navigational interests involved and desirable as a professional accomplishment.

The Lake Survey, in common with other hydrographic organizations the world over, has fully recognized the inadequacy of the sounding method and the desirability of perfecting a practicable submarine sweep. In 1893–1895 Capt. (now Col.) Smith S. Leach, working under a Lake Survey appropriation, designed a submarine sweep 350 feet long and operated it in the examination of the St. Lawrence River in the vicinity of the Thousand Islands. This particular region is the best possible illustration of a waterway with a bottom so capricious that examination by sounding alone would have been seriously inadequate. The Leach sweep marks a notable advance in length and capacity. The design of this sweep, the method of its operation, and the results achieved are fully shown in the Lake Survey report of 1896, beginning page 4062.

In 1902 the Lake Survey constructed the steel ponton sweep float of seven 40-foot sections, making a total length of 280 feet, which is perhaps the most ambitious move toward solving the problem of sweeping made up to that time. This alone is ample evidence that the Survey appreciated fully the weakness of the sounding method of hydrographic examination, and would at any cost supplant it by sweeping. Such a device must of necessity have some experimental features. It was used to some extent on river examinations, using sweep bars of round iron as designed.

Meanwhile the writer had originated the tension-wire sweep and used it on the St. Lawrence River in 1902, as illustrated and narrated in the report of 1903, pages 2763–2764, and had continued its use on a more extensive scale in 1903 and 1904 on Lake Erie.

In 1905 it was decided to operate the ponton sweep float in the open lake, and certain areas were swept under the writer's direction, using five 40-foot sections, or a full sweep length of 200 feet. In fitting out the sweep for this open-lake work, changes were made in the connections linking the several sections together, and the 2⅞-inch round iron bars of the horizontal sweep member were replaced by a system of spindle-shaped weights and wire under tension. The writer's principal contribution to this ponton sweep was this use of wire and weights in the horizontal submerged member. This change was in contemplation of high-speed sweeping and to avoid the strong resistance engendered by passing the heavy cylindrical sweep bars sidewise through the water. Aside from the fact that this water resistance made towing very heavy, it swung the bars backward with consequent lifting, causing some indetermination in the depth swept. The methods used in this work are described and the sweep illustrated in an article on "Submarine Sweeps" by the writer in Engineering News, April 26, 1906. The record of 1½ square miles of area covered with the ponton sweep in one day in 1905 has never, so far as I am aware, been exceeded except with the long-wire sweep, which has doubled that record.

Taking the full-length ponton sweep as covering a breadth of 264 feet (allowing for lap on successive belts) and as running at a speed of 5 miles an

hour, it has a capacity in a ten-hour day of 2½ square miles. It must, therefore, be regarded as an effective mechanism to accomplish determinate hydrographic examinations in such sheltered places as rivers and harbors and small bodies of water. Its maintenance on the open stretches of the Great Lakes presented some difficulty, and in view of the greater effective capacity of the long-wire sweep and its small initial cost, this latter instrument has become the standard device used by the Lake Survey, and all hydrographic parties are equipped with it.

Other organizations are adopting the long-wire sweep, notably the Coast and Geodetic Survey, and the abandonment of the intrinsically vicious system of hydrographic examination by sounding alone is safely forecasted.

The use of taut wire in sweeping was a logical extension of the use of taut wire in sounding, and grew out of the investigations made by the writer on the pressures on wire exerted by water when flowing at different velocities. These investigations, which were made in the swift water of the Niagara River at the International Bridge at Buffalo, were part of the development of the method of sounding with a heavy weight suspended on slender wire. Out of these investigations analyses of the submerged curvature of wire subjected to stream flow were made in the report of 1900, page 5329. A second use of wire to oppose current pressures was as a swinging line for the observing catamaran for current-meter work in the open river at Buffalo. The advantage of wire for this purpose, because of its relatively small resistance, is commented upon in the report of 1900, page 5350. The use of wire in sounding was continued in the resurvey of the St. Lawrence River in 1901 and 1902, and the possibilities of wire for passing with little resistance through the water were much in the writer's mind. It is quite natural, therefore, when a shoal shown on the chart could not be found by soundings, and the alternative was presented of erasing the shoal from the navigators' chart on the evidence of the soundings, or else of constructing a sweep to verify the unbroken depth of the water, that wire should be selected as the basis of a sweep, and that the simple methods of drawing it taut, weighting it down, and buoying it up, should be used. This was in 1902, and the crude sweep built and used to serve its purpose of a day was illustrated after page 2764 in the report of 1903 and described briefly on that and the preceding page. The essential principles of the sweep as used to-day were present in the sweep of 1902.

It was not until the sweep was viewed in the retrospect that all its good features were recognized. It was built without any horizontal wire at the water surface, because it was not apparent that any was necessary; and in the retrospect it is plain that a surface wire would have been a redundant, obstructive member, which would cause the sweep to block the channel in which it was operating. The advantage coming from the fact that vessels may navigate while the sweep passes beneath their keels is particularly strong, because a sweep half a mile or more in length may occupy the whole navigable channel.

In describing the long-wire sweep at this time it should be understood that finalities have not been reached, but that the best forms of all the details are still under experimentation, and the probable line of advance will be noted.

Plate No. 1 shows a wire sweep with an effective length of a quarter of a mile, actuated by two launches. Such a sweep will move at a speed of 2 miles an hour through still water, and at this rate in an eight-hour day will cover 4 square miles of area. Such a length as is shown here may be regarded as a sweep unit, and a full sweep may be extended to embrace two or three or even four or more such units.

There are four principal reasons why a sweep of several units, say four units with an effective length or swath of a mile, is advantageous. First, because the sweep of four units has a capacity of more than four times that of a single-unit sweep, while it employs only two and a half times as many launches. Second, in the sweeping of successive parallel belts by a single-unit sweep the loss coming from lapping one belt over another to make sure of covering the area fully is four times as great as the loss with a four-unit sweep. Third, the locations of the work by sextant readings and the plotting of the same on the field sheets are in the ratio of one to four in the two sweep lengths compared. Fourth, the marker buoys and the labor of placing and lifting them are in the same ratio.

However, the use of a four-unit sweep with a mile length should be employed only on large lake or ocean areas, where meeting an obstruction is rare. It would require a large party, and when obstructions are frequent, the delay to the whole fleet would be serious. It is spoken of here as a possibility, with

a not improbable maximum capacity of from 16 to 20 square miles of area a day. The two-unit sweep, with a neat length of half a mile and a maximum capacity of 8 to 10 square miles a day, is a simpler mechanism, requiring but a moderate equipment of launches and a small party.

The single-unit sweep, as illustrated in plate No. 1, is made up of various members, as follows:

(1) The horizontal member, or sweep wire.
(2) The intermediate verticals.
(3) The terminal verticals.
(4) The towing mechanism.

The horizontal member is of galvanized-iron wire one-tenth inch in diameter. This is cut into 100-foot lengths, and these are linked together by ball-bearing brass swivels. This wire, with a breaking strength of 800 pounds, is strong enough except when it kinks, and the use of the swivels is intended to reduce kinking as much as possible. When aboard the steamer, the sweep wire is coiled on a reel. When sweeping, the horizontal member is drawn taut under a tension of about 100 pounds.

In order to hold the wire at a fixed depth below the water surface, it is suspended at every swivel connection by a vertical wire three-fiftieths inch in diameter and at the ends by ¼-inch cables. The wires of the intermediate verticals are fastened to 14-inch diameter, hemispherical, pressed-steel floats. The tops of these floats are of heavy spun copper and carry at the center a brass deck plate which when unscrewed gives a 3¼-inch opening to allow access to the inside of the float for the purpose of draining out any water that might leak in and for removing dents and maintaining the interior uncorroded. Cast into the cover of this deck plate is a socket three-fourths inch in diameter and 3 inches deep for the insertion of a flagstaff. On the inside of the float, next to the rim and on the same side as the handle, a bar of lead is riveted, which serves to tip the float on edge when the tension in the vertical wire is relieved.

At its bottom the vertical wire carries a lead weighing 10 to 11 pounds. This lead is of a shape that passes through the water with little resistance, and the sweep-wire swivel is attached to it in such a way as to inclose the swivel in the lead form to save water resistance. The minimizing of resistance is a cardinal principle in the design of all details, and any sweep of this type which does not eliminate every possible ounce of unnecessary resistance has not the maximum effectiveness.

The relation between the floats and leads of the intermediate verticals is such that at a speed of 2 miles an hour the resistance of the float and vertical wire will not raise the sweep wire more than one-half foot to every 35 feet of sweep depth. This is a rigid condition.

When the horizontal wire rides upon a smooth rock, the lead weight is lifted and the float rides on edge, dipping its flag. It is impossible to pass over such an obstruction without detecting it. When the wire strikes an obstruction that it can not ride over, the holding of the wire quickly locates it.

The end verticals are of ¼-inch cable, suspended from 28-inch diameter hemispheres of galvanized iron, built up of twenty pieces and having conical tops. A ¾-inch galvanized-iron pipe runs vertically through the float to stiffen it, for a socket for the flagstaff, and to carry the cable attachment at bottom. At the foot of the cable is a cast-iron sphere 9¼ inches in diameter, with a slice taken off the bottom to make a flat base for it to rest on when on deck. This weighs 100 pounds. The sweep wire attaches to it close to its base and the towing cable attaches about midway. The gravity measure of this end weight must care for two influences tending to lift it: First, the lift due to the resistance of the vertical cable and the float; second, the vertical component in the towing cable. The weight assigned is sufficient to care for these two lifting forces. For a sweeping depth of 35 feet and a towing cable length of 100 feet with a pull of 100 pounds the lift is 35 pounds or a little less. The back slant of the vertical cable is very small.

The sweep of this season differs from the sweep of 1902 in the fact that towing is done from the end weight directly, instead of from the end buoy. The object of this change is to eliminate the 300-pound weights previously used, which were exceedingly dfficult to get inboard by hand on a small launch exposed in a seaway. No difficulty is experienced in handling the 100-pound weights.

It has been found that a nominal 3-horsepower gasoline engine in a 26-foot launch has the requisite power to advance one end of the sweep in calm water. A resistance of 150 pounds moved at a speed of 3 feet per second requires but

$\frac{180}{180}$ horsepower to be expended in towing, and the remainder of more than two-thirds of the nominal power goes for engine and wheel losses and the friction of the launch itself. With a head wind it would be better to have a higher power launch and a larger one for greater seaworthiness; but with light wire used in the horizontal member it is likely to be broken by a too powerful launch.

Advance in the sweep design indicates the use of ¼-inch galvanized-wire cable for the horizontal member, with larger and more powerful launches, for exposed areas on the Great Lakes. The use of ¼-inch cable instead of $\frac{1}{10}$-inch wire will lessen breakage, by lessening kinking, and because of the greater strength. Of course the cable will require to be operated under a tension of say 300 pounds, or more than twice the tension in the wire; but while its resistance to passage through the water varies directly as the diameter, its strength varies more nearly as the square of the diameter. The weight of the cable, moreover, will obviate the necessity of intermediate weights, except for housing the ball-bearing swivels, and this will add to the sensitiveness with which flat rocks or sand shoals may be detected. The use of larger and more seaworthy launches will permit working in somewhat rougher weather than is practicable with 26-foot launches. The Lake Survey, owing to its lack of adequate launches, has been using the Survey steamers at one end of the sweep and small launches at the other. The use of two-unit sweeps has been begun, but not reported upon.

In field operations with a single-unit sweep the sweep has been run out from the steamer in twenty minutes, and taking it inboard again at the end of a day's work takes about the same time.

The first belt which the sweep makes is guided by a line of marker buoys, previously set by the steamer running on a fixed course at high speed. As the sweeping proceeds, the buoys are picked up by one launch, while a parallel line of buoys is set out by the launch at the other end of the sweep as a guide for the return belt.

The location of the sweep is accomplished by sextant readings to previously located signals. These readings are all taken from the controlling launch, and the position of the other end of the sweep is arrived at by its direction from the first launch as shown by sextant, and its distance as shown by chord length of the sweep. The chord length of the sweep is determined from the known perimeter length and the angle, at the sweep end, included between the middle intermediate float flag and the chord. The curvature of the sweep wire is taken to be parabolic. Keeping this angle 30° gives the most effective sweep capacity. To keep the belt swept of uniform width, it is necessary to keep this angle always nearly the same, and to keep the off launch in such a position that the chord is at right angles with the axis of travel. The off launch is directed by signals wigwagged from the controlling launch.

During the progress of the sweeping, soundings are made from the controlling launch to develop the bottom contours.

The best record for a day's work made so far during the present season with a single-unit sweep is 3.3 square miles. It must be understood that this record is not possible every day in the open, exposed lake, because sweeping can not be done, on an average, oftener than every other day in midsummer, and not oftener than one day in three in the spring and fall. The best record for a week's work is 13.2 square miles, and this was done in five days' work. Both these records were made by the Lake Survey steamer *Search*, in the south end of Lake Michigan.

Perhaps the most pertinent illustration of the value of sweeping as compared with fine sounding is the case off Sleeping Bear Point, in Lake Michigan. This was sounded in 1906 with the 100-pound cast-iron weight on three systems of parallel lines 100 feet apart. The work was done with the utmost care by an accomplished hydrographer. An obstruction had been reported and it was desirable to find it. The survey was successful in revealing an uncharted 25-foot spot, and 20.5 feet was shown to exist on the sailing line at standard low water. During the season of 1907 the steamer *Gary* was damaged in this vicinity and it became desirable to sweep the area under suspicion. The sweep revealed a keen bowlder ridge showing only 17.5 feet of water, as opposed to 20.5 feet shown by minute soundings. This sweeping was done by the steamer *Col. J. L. Lusk*.

Bulletins.—The bulletins of the survey of Northern and Northwestern Lakes contain important data and information supplemen-

tary to the charts, but of too voluminous a character to be incorporated thereon, and they are accordingly issued free in connection with the charts. Bulletin No. 12, of 1902, and those preceding it, were printed in Washington, but on July 10, 1902, the entire work of printing and issuing bulletins and supplements thereto was turned over to this office. The work of printing is now performed under contract.

The numbers published during the year are as follows:

Supplements Nos. 3, 4, 5, 6, 7, and 8 to Bulletin No. 17, issued on the respective dates July 19, August 21, September 19, October 18, November 19, and December 19, 1907. Bulletin No. 18, issued April, 1908. Supplements Nos. 1 and 2 to Bulletin No. 18, issued, respectively, May 22 and June 20, 1908.

Supplements Nos. 3 to 8, Bulletin No. 17, covered all reported changes of interest to navigators arising between July 1 and December 15, 1907. As occasion arises, small maps showing locations of new shoals, changes in important channels, harbors not otherwise charted, etc., are inserted in the bulletins and supplements. Supplement No. 6 contained an inset chart of the St. Louis Bay cross channel at Duluth-Superior Harbor, which was opened to navigation in 1907.

Bulletin No. 18, thoroughly revised and giving the latest information obtainable as to channels, harbors, obstructions, and other matters of interest to navigators over the entire lakes and connecting waters, was issued late in April, 1908. Features of special note in this bulletin are the tables published in the front of the book, one a conversion table giving equivalent azimuths for all eighth points of the compass, with a view to introducing the use of azimuths among lake mariners, and the other a table of compass testing ranges, giving the 1908 magnetic declinations and the true and magnetic bearings (expressed in points and azimuths) of all the important lighted ranges on the Great Lakes. Azimuths are also being added to the compass roses on all new editions of Lake Survey charts. Supplements Nos. 1 and 2 to this bulletin, issued prior to the close of the fiscal year, covered all changes received to June 16.

A departure from previous custom is that of having the bulletin remain current for two years, with adequate supplements to supply new and changed details during such period. The bulletin has heretofore been republished each spring, but doubt exists as to the necessity for annual revision in view of the preponderance of stable matter and of the inconstant nature of the bulk of the corrected portions, which require revision almost immediately after issue of the book. It is thought the supplements will cover these shifting particulars practically as well as a revised bulletin, and that biennial revision will be sufficiently frequent for the more permanent changes.

An edition of 3,000 copies of Bulletin No. 18 was published, and its exhaustion well within the two-year interval is indicated by the present large demand. The circulation extends to the major portion of the important interests engaged in the navigation of the lakes, as well as to various commercial and industrial concerns and individuals with related activities.

During the past season the information service of the Lake Survey has been increased in usefulness by the issue to important lake navigation interests and to all daily newspapers published upon the

Great Lakes of mimeographed special notices. These notices place in the hands of those concerned the earliest possible information concerning improvements and obstructions to navigation. The Lake Survey acts as a clearing house for information of this character, which is received from the various district engineers upon the lakes and from private sources and is promptly published. The value and necessity of the service are unquestioned.

Water levels.—The stage of water in the lakes and in the interlake and outflow rivers has been recorded, as heretofore, by the regular series of self-registering water gauges, with the changes noted. The gauge at Ogdensburg was discontinued December 31, 1907, and the gauge at Toledo Harbor light-house was discontinued on May 31, 1908. The gauge at St. Clair Flats is maintained by the United States Engineer Office, under Lieut. Col. C. McD. Townsend, Corps of Engineers, during the season of navigation, and by this office during the winter season.

The series of gauges comprised thirteen self-registers and three staff gauges, as follows:

1. St. Lawrence River at Ogdensburg.
2. Lake Ontario at Tibbetts Point.
3. Lake Ontario at Charlotte (staff).
4. Lake Erie at Buffalo.
5. Lake Erie at Cleveland.
6. Lake Erie at Toledo Harbor light-house.
7. Detroit River at Fort Wayne.
8. Lake St. Clair at Windmill Point (staff).
9. St. Clair River at head of St. Clair Flats Canal.
10. St. Clair River at Port Huron.
11. St. Clair River at Port Huron.
12. Lake Huron at Harbor Beach.
13. Straits of Mackinac at Mackinaw City.
14. Lake Michigan at Milwaukee.
15. Lake Michigan at Poplar street, Milwaukee (staff).
16. Lake Superior at Marquette.

The staff gauge at Poplar street, Milwaukee, was discontinued August 10, 1907, and that at Charlotte, N. Y., December 31, 1907.

In addition, this office received records of the self-registering gauges maintained by the district offices as follows: Detroit River at Amherstburg, Lake Michigan at Chicago, St. Marys River below the locks, and St. Marys River above the locks, and records of staff gauge readings on Lake Ontario at Oswego and on Lake Superior at Houghton and Duluth.

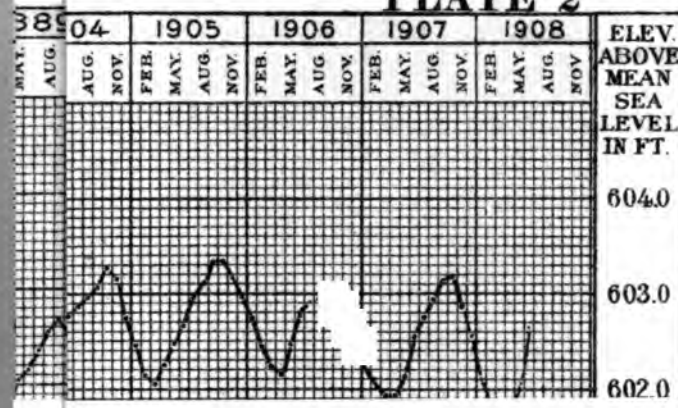
The zeros of all gauges maintained by the Survey have been carefully checked during the past year and the instruments overhauled. The records are for the most part excellent.

Monthly means of water level for stations named, expressed in feet above mean tide at New York.

(Adjusted levels of 1903.)

Stations.	1907.						1908.					
	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May.	June.
Marquette	602.70	602.93	603.17	603.15	602.88	602.53	602.10	601.87	601.72	601.63	602.03	602.
Milwaukee ...	581.48	581.40	581.38	581.13	580.72	580.61	580.44	580.53	580.60	580.92	581.48	581.
Harbor Beach.	581.64	581.49	581.42	581.21	580.83	580.62	580.52	580.43	580.58	580.85	581.26	581.
Cleveland	573.31	573.03	572.77	572.69	572.41	572.26	572.57	572.19	572.66	573.27	573.51	573.
Oswego	247.12	246.90	246.50	246.40	246.33	246.33	246.73	246.99	247.39	248.02	248.46	248.

PLATE 2


1904
1905
1906
1907
1908
MAY.
AUG.
AUG.
NOV.
FEB.
MAY.
AUG.
NOV.
FEB.
MAY.
AUG.
NOV.
FEB.
MAY.
AUG.
NOV.
FEB.
MAY.
AUG.
NOV.
ELEV. ABOVE MEAN SEA LEVEL IN FT.
604.0
603.0
602.0

There is herewith a sheet showing the monthly mean water levels of all the Great Lakes from January, 1860, to June, 1908, both inclusive. (See Pl. 2.)

During the year there has been issued a series of notices to navigation interests, giving the monthly mean stages for all the lakes during the preceding month, comparing these stages with corresponding ones for critical years, and predicting the stages to be expected for the following month. These notices have been accepted as authoritative and of great usefulness.

Investigation of lake levels.—The taking of air and water temperatures was continued during part of the year at the stations at Toledo Harbor light-house, Charlotte, and Horseshoe Reef, and by the steamer parties engaged in hydrographic work.

The following table gives a summary of discharges, as so far determined, corresponding to the mean elevations of the various lakes for the last forty-eight years:

Table of mean discharges.

Mean elevation for 48 years (1860-1907) above mean tide at New York City.		Corresponding mean discharge in cubic feet per second.	
Lake.	Stage.	River.	Discharge.
Superior	602.31	St. Marys	77,000
Michigan-Huron	581.32	St. Clair	[a]204,000
St. Clair	575.75	Detroit	209,000
Erie	572.60	Niagara	[b]215,000
Ontario	246.19	St. Lawrence	243,350

[a] This does not include amount passing through Chicago Drainage Canal.
[b] This includes 1,200 cubic feet passing out through Erie Canal and 1,100 cubic feet through Welland Canal.

During the past year the operations of the Survey and the maintenance of its equipment have been hampered by the lack of funds, but much of this trouble will be cured by the increased appropriation made for the current year.

The floating plant of the Survey consists of five small steamers, none of them specially designed or fitted for the work, and a small sail and power boat. Two of the steamers carry launches to assist in sweeping and inshore sounding. The steamers above referred to are the following: The *Search*, a yacht, formerly the *Enquirer* of Buffalo, which was built to be a racing machine. She is light in construction, not too seaworthy, and possesses but little deck room. Her boiler and machinery are unnecessarily expensive to maintain. The *Col. J. L. Lusk* (formerly the *General Williams*) is a converted tug, the main deck of which has been inclosed and a half cabin added aft of the pilot house on the spar deck. This vessel has a substantial hull and excellent boiler and engine, but is very cranky and, because inclosed, is not specially suited to survey work. The *Surveyor* (formerly a freight boat, then a passenger steamer—the *Lorain L.*) is now out of service, due to the need of extensive repairs. The *No. 1* is a small steamer, practically a launch, the hull being 69 by 13.6 by 4.4 feet. She is also inclosed. The *No. 2* (formerly the *Fanny H.*) is out of service. Her hull is new, but she now needs repair or replacement of engine and boiler.

Effort has been made to fit all these vessels to do the work of the Survey, but the result is expensive and unsatisfactory. An inclosed

vessel answers very well for harbor work, serving practically only for sounding in still water and for housing the field party. On the open lake a survey vessel fitted for sounding and sweeping should have a length of 100 to 120 feet, a beam of 18 to 24 feet, with a draft of 9 to 12 feet, ample power, a speed not greater than 12 miles, living accommodations for a total of 20 to 30 men, and, above all, ample deck space, unhampered by superstructure other than pilot house, smokestack and engine room hatch and skylight. Freeboard should be the least compatible with safety. Such a vessel, fitted with capstans, winches, and hoists, all mechanically operated, is capable of doing work of sounding and sweeping with ease and economy, and should cost not to exceed $50,000. Three of them would amply replace the five above described now belonging to the Survey.

The season for survey work on the Great Lakes at the utmost extends from May 15 to November 15, a period of six months. This is a short time and should be used to the highest possible advantage, with ample funds and an efficient equipment.

The present approved general project for the operations of the Lake Survey contemplates the completion of all surveys and other operations needed to modernize and improve and complete the series of charts and will require eleven seasons of work with the existing equipment employed to its full capacity. Such employment will require an annual appropriation of $125,000.

I therefore recommend the appropriation of this amount, as follows:

For survey of Northern and Northwestern Lakes, including all necessary expenses for preparing, correcting, extending, printing, and issuing charts and bulletins, and of investigating lake levels with a view to their regulation, to be immediately available and to remain available until expended, $125,000.

Dates and amounts of appropriations for surveys of Northern and Northwestern Lakes.

March 3, 1841	$15,000	March 2, 1868	$77,500
March 18, 1842	20,000	July 20, 1868	75,000
March 1, 1843	30,000	March 3, 1869	100,000
June 17, 1844	20,000	July 15, 1870	100,000
March 3, 1845	20,000	March 3, 1871	175,000
August 8, 1846	25,000	June 10, 1872	175,000
August 12, 1848	25,000	March 3, 1873	175,000
March 3, 1849	10,000	June 23, 1874	175,000
September 28, 1850	25,000	March 3, 1875	150,000
March 3, 1851	25,000	July 31, 1876 (not including $16,000 applied to survey of Mississippi River)	84,000
August 30, 1852	25,000	March 3, 1877 (not including $25,000 applied to survey of Mississippi River and including $9,500 received from sale of steamers)	94,500
March 3, 1853	50,000	June 20, 1878 (not including $49,500 applied to survey of Mississippi River)	49,500
August 5, 1854	50,000	March 3, 1879	85,000
March 3, 1855	50,000	June 16, 1880	40,000
August 30, 1856	50,000	March 3, 1881	18,000
March 3, 1857	50,000	August 7, 1882	12,000
June 12, 1858	75,000		
March 3, 1859	75,000		
June 21, 1860	75,000		
March 2, 1861	75,000		
July 5, 1862	105,000		
February 9, 1863	106,879		
July 2, 1864	100,000		
February 28, 1865	125,000		
June 12, 1866	50,000		
March 2, 1867	77,500	Total	2,939,879

Printing and issue of charts for use of navigators and electrotyping copperplates for chart printing.

March 3, 1883	$3,000	March 3, 1893	$2,000
July 7, 1884	3,000	August 18, 1894	2,000
March 3, 1885	3,000	March 2, 1895	2,000
August 4, 1886	2,000	June 11, 1896	2,000
March 3, 1887	2,000	June 4, 1897	2,000
October 2, 1888	2,000	July 1, 1898	3,000
March 2, 1889	2,000	March 3, 1899	3,000
August 30, 1890	2,000	June 6, 1900	3,000
March 3, 1891	2,000		
August 5, 1892	2,000	Total	42,000

Surveys and additions to and correcting engraved plates.

March 2, 1889	$5,000	June 11, 1896	$25,000
August 30, 1890	10,000	June 4, 1897	25,000
March 3, 1891	10,000	July 1, 1898	25,000
August 5, 1892	5,000	March 3, 1899	25,000
March 3, 1893	25,000	June 6, 1900	75,000
August 18, 1894	25,000		
March 2, 1895	25,000	Total	280,000

Surveys, including investigations of lake levels, correcting, printing, and issuing charts and bulletins.

March 3, 1901	$100,000	June 30, 1906	$75,000
June 28, 1902	150,000	March 4, 1907	75,000
March 3, 1903	150,000	May 27, 1908	125,000
April 28, 1904	150,000		
March 3, 1905	100,000	Total	925,000

Money statement.

SURVEY OF NORTHERN AND NORTHWESTERN LAKES.

1907.			
July 1.	Balance unexpended		$73,628.33
	Deposits to credit of appropriation:		
Oct. 18.	Overpayment on voucher 68, August, 1907	$0.25	
1908.			
Feb. 20.	By Col. Chas. E. L. B. Davis, Corps of Engineers, for sweeping float	5,833.33	
	By Capt. G. R. Lukesh, Corps of Engineers, printing maps for Mississippi River Commission	187.00	
Mar. 9.	By Capt. G. R. Lukesh, as above	132.97	
Apr. 2.	Overpayment on voucher 19, October, 1907	.05	
May 6.	By Chief of Engineers, for 3,500 pounds chart paper	250.00	
June 10.	By Capt. G. R. Lukesh, as above	700.00	
June 18.	Allotted from act approved March 4, 1907	700.00	
	Allotted from act approved May 27, 1908	120,000.00	
			127,803.60
			201,431.93
June 30.	Amount withdrawn during fiscal year	15.71	
	Amount expended during fiscal year	[a] 76,691.53	
			[a] 76,707.24
	Balance unexpended		124,724.69
	Outstanding liabilities		7,716.45
	Balance available		117,008.24

[a]Amount expended during fiscal year includes $7,103.60 deposited to credit of appropriation as above itemized, which had been previously included in expenditures of present or past years. Deducting this amount, the net total expended and withdrawn is $69,603.64.

H H H 2.

PRESERVATION OF NIAGARA FALLS.

At the beginning of the fiscal year, under an allotment of $5,000 from the appropriation of the act of June 29, 1906, field operations had been in progress since May 20, 1907.

The field party under Junior Engineer Sherman Moore continued work until December 14, 1907, and then returned to Detroit for the purpose of reducing the results and preparing a report.

The programme of operations outlined in the project dated April 30, 1907, and approved by the Chief of Engineers May 8, 1907, was completed with the close of the field season of 1907. It included such slope, discharge, and current observations as would help to determine the effect of existing and proposed diversions of water for power purposes, at and near Niagara Falls, upon the level of Lake Erie, the navigable capacity of the Niagara River, and upon the scenic grandeur of Niagara Falls, so far as the last depends upon height of crest and volume of flow, these being measurable elements.

The following extract from the report of Principal Assistant Engineer Francis C. Shenehon details the field operations and office work involved:

At the beginning of the fiscal year the season's work, begun at Niagara Falls in the latter part of May under Junior Engineer Sherman Moore, was well advanced. Self-registering water gauges had been set at Black Rock, Chippawa, Grass Island, Suspension Bridge, and in the Whirlpool, and some staff gauges at other places; soundings in the approach to the rapids had been completed and some work done on a contour survey of the rapids.

Early in July, 1907, seven triangulation stations of the New York State survey of 1890 were read into the triangulation net of the Lake Survey to serve as further references for studies on the recession of the crest lines of the Falls.

On July 9, a sixth self-registering gauge was set at Wing Dam, in the upper reach of the American channel, and arrangements were begun for measuring the flow in that channel. A section where the flow was most uniform for a length of 100 feet with fairly smooth water was selected, and ranges to mark the terminals of the 100-foot base were set up. Standards of timber were erected on Goat Island and the main shore as abutments, and a line was carried across the channel by means of a kite, and a cable of signal cord stretched across. In attempting to taut this cable up to sound from it, it was overstrained and broken. Later in the season a new cable of $\frac{5}{32}$-inch Swedish iron, resting on 16-foot towers, was stretched across the channel. A carrier was built to ride on this cable, and by means of a tripping device floats could be sent out and dropped into the stream above the 100-foot base, with such spacing laterally as the observer chose.

Two series of floats were dispatched from this starting cable: First, a series with varying stem lengths, which served to give the depths, needed to get the cross-sectional area; second, a series to determine velocities at all points. Operating in this way, twelve distinct measurements of the volume of flow through this channel were made. It appeared, on the reduction of these observations, that the flow at the time of the measurements was about 4.8 per cent of the full river volume.

On July 22, the three current meters intended for the extensive measurements in hand were taken to Cayuga Creek and, during the following five days, were rated on a still-water base.

The measurement of the flow in the canal of the Niagara Falls Hydraulic Power and Manufacturing Company was then taken up. The best section available in the lower canal was at Main street, and, operating from the bridge there, twenty measurements were made of the volume of flow. This work was done with exceeding care in all details, and occupied the party from July 29 to August 24.

Meanwhile a second section, whose measurements would serve as a check on the results obtained on the Main street section, was established toward the upper end of the canal at the New York Central Railroad crossing. As the bridge here cuts the canal diagonally, it was necessary, in order to get a section normal to the axis of the canal, to erect a cableway and build a carriage from which the meters were operated. In measuring the velocities here, as at Main street, three different current meters were used, and generally two meters simultaneously, following the two-meter method used by me in work on the Niagara and St. Lawrence rivers, as described in the reports of 1900 and 1903.

Coefficient work alone was done and no discharge measurements, as such, were taken. The final reduction in both of these sections was to establish such coefficients that, when the velocity is measured in a single controlling point in the section, and a gauge reading accompanies this measurement, the volume of flow is indicated. The test of the accuracy of each section was that simultaneous measurements at Main street and at the railroad crossing should show the same volume of flow. It is very satisfactory to state that, despite extremely broken flow, due to dredging in progress, the movement of a tug and dump scows, and the presence of falsework partially blocking the canal where bridges were under reconstruction, the check in the volume of flow by the two independent sections is 1.7 per cent.

The maximum flow through this canal, as measured, was 3,080 cubic feet per second, which is less than half the water permissible in the allowance granted under the Burton Act. In December twelve additional measurements of the flow were made at Main street.

On September 6 work was begun on the measurements of flow in the canal, or forebay, of the Niagara Falls Power Company. The first of the two sections measured is about 200 feet below the head of the canal. Two cables were stretched across the canal, elevated at the sides by wooden trestles. The observing carriage, carrying one man and two current meters, traveled on this cableway. A box gauge, with bottle-and-staff float, was placed against the west wall close to the section. The cross-sectional area was determined by very careful soundings, measurements of the side slopes, and water-surface readings. The profile of the bottom was checked by a series of instrumental level readings, on a long rod, with cutwater edge, which rested on the bottom, and a similar series was read on the water surface.

The two-meter system of stream measurement was used on this canal, as on the Hydraulic Canal. While measurements were in progress on the cableway, a third meter was operated at the head of the canal, at a fixed percentage depth, and suspended from a fixed point on the pulp-wood conveyor viaduct. The object of this third meter was to establish a single station, such that velocities measured there in connection wtih a water-surface reading at the cableway, or on the section gauge, would permit the volume of flow to be easily computed by means of reduction coefficients. All the current-meter work was done with great care. Up to October 7, fifteen measurements of the volume of flow were made.

While this work was in progress the flow was measured passing through the canal of the International Paper Company, which branches from the Power Company's canal above the hydraulic section occupied by the cableway. The flow through the hydraulic section, with the addition of the flow in this branch canal, constitutes the diversion of this company.

As the amount of water used by the Power Company varies somewhat with the time of day or night, on October 2 and 3 a continuous measurement was made for twenty-four hours. The Sunday flow was, later in the season, also determined.

The current meters were re-rated on a still-water base in Cayuga Creek after October 7.

The party then went to Buffalo and made forty different measurements of the flow of the Niagara River from the International Bridge. The hydraulic section of the river here is the same as used in 1897 to 1900, and fully discussed by me in the report of 1900. In the measurements of the past year no coefficient work was done and no soundings made, the cross-sectional area and the reduction factors being taken as established in 1898-99. These measurements were made between October 21 and November 4, and utilized all meters.

The object of these measurements was to test the level of Lake Erie by deriving its elevation from the discharge formula,

Elevation of lake = Function of Discharge.

So far as these results go they show no lowering of Lake Erie to have resulted from the increase in the diversions since 1898–99.

At the same time sixteen measurements of the volume of flow in the Erie Canal were made, showing a mean flow of 768 cubic feet per second.

On November 6 the current meters were rated again at Prospect Reservoir in Buffalo on the same rating base used by me in 1898–1900.

The party then returned to Niagara Falls and made fifteen additional discharge measurements on the original hydraulic section in the canal of the Niagara Falls Power Company. A second hydraulic section was then laid out about 75 feet below the first section and twenty discharge measurements were made between November 20 and December 5. The results obtained by this new independent hydraulic section check the results on section No. 1 within less than 2 per cent.

During the time of these measurements on sections 1 and 2 the diversion of the Power Company shows a mean of 8,335 cubic feet per second, which is less than the authorized limit of 8,600 cubic feet. However, at times the diversion reaches 9,200 cubic feet, which exceeds the limit by 7 per cent.

In the latter part of November, when work was in progress on the measurements in the Power Canal, a box gauge was set close to the crest of the American Fall at Prospect Point, and a series of floats was thrown from the Goat Island Bridge to determine the depth on the brink of the fall at thirty-five different places along the crest line.

On December 11 and 12 check levels were run to test the elevations of all gauge zeros, and the party left for headquarters at Detroit on December 13.

During the winter the work was reduced and the great amount of data collected was assembled, analyzed, and prepared for publication. A report of all operations and results was prepared.

It is not too much to say that at the present time the intangible problem presented has been rendered tangible, and that decisions on the points arising out of water diversions are on a footing of simple demonstrated fact.

Junior Engineer Sherman Moore, who has had immediate charge of the surveys and reductions, is entitled to warm commendation. The work has been delicate, difficult, dangerous even, but it has been handled safely and adequately.

The allotment of $5,000 made April 27, 1907, having become exhausted February 1, 1908, before the reductions were completed, the work was continued with Lake Survey funds. The amount thus expended up to May 31, 1908, was $2,008.73, and this is to be refunded to the Survey from the appropriation under the Burton Act.

The work accomplished having proven satisfactory and valuable, it appeared desirable to extend the observations through another season, with a view of getting additional light on the question of the effect of the diversions on Lake Erie and of getting still further data on the equivalent lake and river heights as shown by the water gauges. The evidence on the effect of diversions on Lake Erie was slightly contradictory, and it was proposed to make sixty additional measurements of the volume of the flow of the Niagara River, operating from the International Bridge, as before, as a further test.

Under date of May 18, 1908, an allotment of $3,000 was made from the appropriation under the Burton Act, and on May 24, Recorder Fred Lockwood was sent to Niagara Falls to install the water gauges preliminary to the work projected. On June 12, Junior Engineer Sherman Moore, with the remainder of his party, went to Niagara Falls.

On June 14, the two power companies on the American side shut down for a few hours. The effects of this cessation of diversion was observed by a series of gauge readings and current-meter measurements. A storm on Lake Erie, resulting in a decided rise at Buffalo, interfered with the conclusiveness of the test. For that portion of the time when the weather was quiescent the effect at different points in

the river was close to the predicted values. The rise on the crest of the American Fall was a tenth of a foot.

At the end of the fiscal year eight self-registering gauges are in operation in the river, ten measurements of the discharge of the river at the International Bridge have been made, the current meters have been rated, and the work is well advanced.

Something more of the detail of the work is contained in the following brief extract from the report of Principal Assistant Engineer Francis C. Shenehon:

Notification of an allotment for work on the Niagara River having been received in Detroit May 23, on the following day Recorder Fred Lockwood was dispatched to Niagara Falls to make the gauge installations. By June 5, eight self-registering water gauges had been set and were in operation, as follows: At the foot of Austin street, Buffalo; at Schlossers Dock, Echota; at Chippawa; at Grass Island; at Willow Island; at the west end of the Horseshoe Falls; at Suspension Bridge, and in the Whirlpool.

This office having been notified that the Niagara Falls Power Company would shut down its canal for perhaps six hours on June 14, to permit an examination of the east abutment of the highway bridge close to the mouth of its tunnel, preparations were made to observe the effects coming from this temporary cessation of a diversion amounting to 8,000 cubic feet per second. The writer, with Junior Engineer Sherman Moore and his party, arrived in Niagara Falls on the evening of June 12. The arrangements for the tests, which had been in progress under the supervision of Recorder Lockwood, were perfected.

Box gauges were set at the heads of each of the two large canals on the American side, to test at intervals the records of the self-registering gauges maintained by the power companies. A box gauge was set also on the hydraulic section, as in 1907, in the Niagara Falls Power Company's canal. A box gauge was set also at Prospect Point, close to the crest of the American Fall, in the same position as that of the self-registering gauge in 1907. Readings at ten-minute intervals were taken on the gauge at Prospect Point, beginning on the morning of the 13th, to observe precedent conditions, and were continued night and day up to the morning of the 15th, to secure a record of conditions during the shut down and afterwards.

To make sure of a record at Buffalo and at the foot of Austin street, staff-gauge readings were taken during the critical period to reinforce the self-registers. The gauges at Niagara Falls were insured against stoppages by a constant patrol.

Current-meter measurements were made of the volume of flow in both large canals before the shut down, as the gates were closed, and after they were opened again.

Had the weather conditions remained good, even so brief a shut down as this would have given much valuable information, for, in addition to the shut down of the Niagara Falls Power Company, the Niagara Falls Hydraulic Power and Manufacturing Company had arranged to shut down, so as to permit the greatest possible change as a basis of observations.

The results are diminutive compared to the large preparations. The shut-down in the Power Canal began about midnight and was completed by 1.20 in the morning. The Hydraulic Canal, on the other hand, had not completed its shut down before 6 o'clock Sunday morning. Meanwhile a stiff southwest storm on Lake Erie arose about midnight and caused the water at Buffalo to rise 1½ feet between midnight and 3 o'clock in the morning. The influence of this rise, causing increased flow in the river and therefore greater heights at all points, is entangled with the rise coming from the shut down, and the two can not be separated. The rise on the crest of the American Fall between midnight and 3 o'clock was one-tenth foot. Up to 2 o'clock it was 0.06 foot, or three-fourths inch, and this rise is largely attributed to the shut down, and is entirely corroborative of predicted values.

After the completion of this work the party went to Buffalo, rated the three current meters at Prospect Reservoir, and by the end of the fiscal year had made ten discharge measurements at the International Bridge. At the same time all self-registering water gauges were maintained and some measurements of the flow in the canal of the Power Company were made.

Reductions of the data are also in progress, looking to an early submission of the results.

It has been intended to submit with this annual report a final report, accompanied by many tables of data and many drawings, with photographs of the Falls with ranging volumes of river flow. Such a report is close to completion. However, in special reports many of the results have already been epitomized.

The notification of a shut down of the Niagara Falls Power Company in July, which will be in force for a week or ten days, makes it desirable to incorporate in the final report submitted the results of this temporary return of the river to a condition which in effect dates back fully ten years. In this week or longer the river will have adequate time to readjust its flow, and very definite results in corroboration of the values already derived by long observation are looked for.

Money statement.

PRESERVATION OF NIAGARA FALLS.

July 1, 1907, balance unexpended	$4,542.34
May 18, 1908, allotted from act approved June 29, 1906	3,000.00
	7,542.34
June 30, 1908, amount expended during fiscal year	4,571.45
July 1, 1908, balance unexpended	2,970.89
July 1, 1908, outstanding liabilities	665.42
July 1, 1908, balance available	2,305.47

APPENDIX I I I.

IMPROVEMENT OF YELLOWSTONE NATIONAL PARK, INCLUDING THE CONSTRUCTION, REPAIR, AND MAINTENANCE OF ROADS AND BRIDGES.

REPORT OF CAPT. E. D. PEEK, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

UNITED STATES ENGINEER OFFICE,
Yellowstone Park, Wyo., July 7, 1908.

SIR: I have the honor to forward herewith my annual report for the fiscal year ending June 30, 1908, for the improvement of Yellowstone National Park.

Very respectfully, your obedient servant,

E. D. PEEK,
Captain, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

The work during the last fiscal year ending June 30, 1908, was executed under the appropriations of March 4, 1907, and May 27, 1908, and consisted of maintenance and repair of the roads and bridges already built, together with a few minor improvements.

GARDINER ENTRANCE.

The trees, shrubs, vines, and lawns about the entrance were maintained throughout the tourist season, and with the advent of winter were protected from the severe weather when necessary.

MAMMOTH HOT SPRINGS.

The maintenance of lawns and shrubbery was continued throughout the summer, and all trees and shrubs liable to winterkill or to injury by game or stray stock were protected by suitable tree guards and movable wire fences.

Several large trees were planted near the engineer buildings, together with some bushes and hedges, which have added materially to the appearance of the place. A large portion of the original formation about the large cluster of willows and shrubs in the corner

of the lot containing the engineer office was removed and replaced by earth, so as to allow the shrubs to grow more luxuriantly. This same method was followed at the cluster near the hotel.

PLANT.

All sprinkling wagons in the park, together with the graders, wagons, tools, etc., were thoroughly inspected and the necessary repairs made. All express wagons and buggies were painted.

The portable planer, which was used last season at the sawmill site, was installed in the machine shop at Mammoth Hot Springs. Work was begun on a storehouse or storage barn for the housing of graders, carts, wagons, wheel scrapers, and other equipment which have hitherto been exposed to the elements. It is expected to complete this barn during the summer and to store therein the above articles, together with such quantity of hay as is needed for the summer use.

SPRINKLING.

The length of road sprinkled at present is approximately 85 miles. Improvements in the plant are being made continually. As fast as the available funds permit additional gravity tanks for filling the sprinklers are being installed. On account of the limited sprinkling in the vicinity of the Thumb and west of the Lake Hotel, the unsatisfactory state of the plant, and the limited funds available it was thought best to discontinue sprinkling on those sections. About 20 rams were installed at old pumping stations, making them now gravity fills. Additional gravity tanks were put in on the Mammoth Hot Springs-Golden Gate road. The route from Gardiner to Norris is now equipped entirely with gravity fills, and shortly will be so to the Wylie Camp on the Gibbon, at the 10-mile post beyond Norris. However, even with sprinkling, considerable complaint is made. The road material in the park, as a rule, is very poor and easily ground into dust, which sprinkling can not entirely overcome, except in some places, but it does materially diminish the quantity.

Arguments have been advanced that the cost for this sprinkling should be charged to the transportation companies using the road. I am of the opinion that this view is not well grounded, as I feel that the sprinkling is no more for the direct comfort of the tourists than it is to save the road from being blown away as dust. It is as essential to the life of the road as it is to the comfort of the tourist.

BRIDGES AND CULVERTS.

New decking was laid on two bridges across the Firehole River, one crossing being near the Riverside Geyser and the other on the Upper Basin-Thumb road at the junction with Spring Creek.

A small additional bridge was put in on the flat near De Lacy Creek.

The bridge across Alum Creek, some 120 feet long, was replaced by a fill and a 30-inch culvert.

The 25-foot bridge at Obsidian Cliff and the 15-foot bridge at Apollinaris were each replaced by fills having 4-foot culverts. At Obsidian Cliff the road was raised over 2 feet to improve the grade,

and it was also straightened. A fill of a foot was also made at Apollinaris.

Four 12-inch culverts were put in on the West road, and one 12-inch culvert at 9½ miles on the Norris-Fountain road, all of corrugated sheet iron, riveted together. Such culverts are far superior to tile, as they are lighter, more easily laid, and more satisfactory. They are riveted bands, 2 feet long, made into a single length as required, so that there is no trouble from the separation of sections which often happens in tile culverts, and which very often is the cause of the earth being washed away at the joints and making holes in the road. These iron culverts do not require more than an inch of earth to cover them, and they can therefore be used where tile is not feasible. Tile, as a rule, require 18 inches of covering to make them safe against breakage.

It is intended to replace a great many of the small bridges with iron culverts, as the road is then more uniform and less liable to accidents. The replacing of bridges and fills by culverts also makes driving more easy.

Two tile culverts, 12 inches and 24 inches, were put in at 1½ miles on the Gardiner-Mammoth Hot Springs road, and a 24-inch culvert at 1¾ miles on the Fountain-Upper Basin road.

Six blind rock drains were laid on the Springs-Norris road between the 12 and 19 mile posts, and one at 2¾ miles.

Minor repairs were made to the bridges at Otter Creek, Herron, and De Lacy.

SIGNS.

Of the 600 enameled steel signs purchased last year, some 500 were set up at different points in the park. They wear well and are practically indestructible.

Neat frames covered with glass showing the analyses of the spring water and medicinal values thereof were put up at Mammoth Hot Springs for the Soda Spring, and also at Apollinaris Spring.

PETRIFIED TREES.

A neat iron picket fence, with gates and set upon a neat concrete base, was erected around the tree situated three-fourths of a mile from the main road near Yancey's. A second stump in the immediate vicinity should be similarly protected.

These trees are situated on the steep hillside some distance above the road. It is proposed to erect a platform at the roadside and another at the trees, with a suitable connecting stairway.

SURVEYS.

The act of March 4, 1907, appropriated $1,000 for a survey for a road from the point where the Gallatin River crosses the west boundary to a point on the Mammoth Hot Springs-Norris road.

The first survey was begun on June 9, 1907, and completed July 2, 1907. This route, via the Gallatin River, Big Horn Pass, and then to Indian Creek on the Norris-Mammoth Hot Springs road, was deemed unfavorable, and on July 28, 1907, a second party left Boze-

man and began a survey via Gallatin River, Fan Creek, Snowshoe Pass, thence down the Gardiner and Glen Creek to Golden Gate. The second route, also, was not recommended. The estimated cost, distances, and recommendations are contained in a special report submitted to the Chief of Engineers under date of October 19, 1907, which also expresses the views of the superintendent of the park, who coincides with the engineer officer in charge in not favoring any route from the Gallatin, principally for the reasons that the burden of maintaining the necessary existing roads and of properly guarding the park is now very great, and that the proposed new road would add materially to this burden without any corresponding benefit to the general public.

CAMPING GROUNDS.

The best camping grounds throughout the park on the main route of travel have suitable signs reading "Good camp." All camps have been thoroughly cleaned up, and pits have been dug for dumping of refuse and cans. In a great number of the camps signs indicating the pits have been put up.

CAMPS AND HOUSES.

In addition to the camps established last year at the Canyon Junction and Obsidian Cliff, permanent camps, having floors for tents and forms for the canvas, were built at Beryl Springs, Excelsior Geyser, Upper Basin, Thumb, Lake, and Trout Creek. In all of the camps permanent bunks were also constructed for the employees. This has made a marked improvement in the general police of the camps. The amount of work that may be expected from men having better accommodations and not being required to sleep on the ground is considerably increased.

The three houses on the Divide which were begun last year were completed. A barn containing a granary was built at Spring Creek on the Divide road.

PAINTING.

The platforms, stairs, and landings at Mud Geyser, Keppler Cascades, Upper Falls, Lower Falls, Artist's Point, Grand View, and Inspiration Point were painted to blend with the surroundings.

Two outhouses at each of the above places and at Dunraven Pass and Mount Washburn were also painted, together with the three houses on the Divide between Upper Basin and Thumb.

HIRE OF TEAMS.

Prior to the season of 1907 contracts were made at the rate of $2.75 per day for ordinary teams and $3 per day for sprinkling teams. The latter are required to be heavier and to have better equipment. At that rate the contractor fed the teams and kept them shod. This method was changed last season, and the contract is now made for the bare team and wagon, the Government feeding the teams, keeping them shod, and hiring and paying the drivers separately. It is required, however, that the horses be shod when they come on the work.

Under the present method the price has been $1.10 per day for general work teams and $1.25 per day for sprinkling teams.

Many teams are hired direct as team and teamster, and no difficulty is encountered in obtaining stock.

Hay is now purchased in the fall, and stored in barns and sheds at different points, so that it will be available in the spring when the roads are being opened and where hauling is impossible on account of the snow.

This method of contracting for teams is much more satisfactory and makes a great saving to the Government. The subcontractors are also better satisfied with the new method, as they are confident that their teams will receive a proper allowance of feed.

It is intended to build two additional barns this summer—one at Beaver Lake and one at Trout Creek. Native hay can be cut at these places at a cost of $7 and $8 per ton, the cost of bringing the same from outside points varying from $18 to $25 per ton.

MANGERS AND STABLES.

In addition to the barns at Spring Creek, on the Divide between Upper Basin and Thumb, mangers with feed boxes were built at Beaver Lake, Beryl Springs, Excelsior Geyser, Upper Basin, Thumb, Lake, Trout Creek, Canyon, and two points on the Lake-Canyon road where the sprinklers meet. These mangers more than paid for themselves in the saving of hay and grain, which was previously wasted by feeding on the ground.

GENERAL REPAIRS.

This work consisted, in a general way, in making the necessary fills and hauling of surfacing material where most needed. The repairs were very limited in extent and no marked improvement was made on account of the limited funds on hand.

On the Mammoth Hot Springs-Gardiner road considerable work was again required at the slide in the bend about 1½ miles from Gardiner, which has been troublesome for more than a year. An additional 2,000 yards or more of earth were removed and it was thought that, with the quantity removed a year ago, it was secure, but it proved again troublesome on account of the numerous openings which are in the sidehill. It is contemplated to remove the balance of the pocket in the fall of 1908 and put in drains to keep the soil dry.

A few yards below this slide difficulty was again experienced during high water in keeping the road from being washed out. The wall at this point was faced with planks which were held in place by large steel bars. This section, probably a stretch of 100 yards of dry rubble, should be laid in mortar this season. It is hoped that sufficient funds will remain on hand to do so when the low-water season arrives.

On the Springs-Norris road surfacing was done from Silver Gate to the 5-mile post across Swan Lake flat, a distance of 2½ miles, also from 10¼ to 12½ miles. In the vicinity of Crystal Spring and the 11-mile post considerable work was done on the roadside in order to deepen the ditches and give the road a good, high crown. Surfacing was also done on the Norris-Fountain road from 2½ to 2¾ miles.

The hill in the Fountain-Upper Basin road near the 7-mile post was also surfaced.

On the Upper Basin-Thumb road surfacing was done from 13 to 13½ miles. This stretch of road was washed bare of all surfacing material by the torrent which overflowed the bank of the stream during the opening thaws.

A small fence, made of iron posts with wire stretched between, was put around the Paint Pots in the vicinity of the Thumb Station.

On the Lake-Canyon road extensive work was begun during the last of June from 2½ to 3½ miles from the Canyon. It is intended to crown the road to a considerable degree and to dig good ditches for drainage along the sides.

Considerable objection has always been made by the transportation companies to the presence of any ditches, save very shallow ones. The past spring, which was unusually wet, has thoroughly demonstrated the necessity of better drainage and deeper ditches, as those portions of the road which were well crowned and had good ditches were much better roads during the excessive rains. The greater portion of the Canyon-Lake road is earth, and the ditches will help it materially. The section from 2½ to 3½ miles is about completed, and it is intended to extend this work to some 8 miles more of the road during the summer.

On Mount Washburn a neat circular iron fence was built around the mass of rocks on the flat circle at the top of the mountain. These rocks are part of the original top, and it was desired to keep horses from trampling upon them and knocking them down. This railing or iron fence serves as a place for tying horses. A second rail for hitching animals was placed on the "Y" level, a few feet below the summit, where the road divides to go to Tower Falls and the Canyon. The road over the mountain was open for tourists on July 12.

Considerable work was done on the road leading to the western entrance. The section along the north bank of the Madison River, at the foot of the hill where it passes through swampy ground, was raised, materially increased in width, and surfaced. The road leading west up the hill from the Madison River bridge was widened and crowned, necessitating the removal of a very large number of rocks. The hill east of the Soldier Station was also put in good condition. The clearing of one-half mile, which had been made from the Soldier Station west, was completed, all rock removed and road graded into shape, and surfacing material added. The section from the 2-mile post to the Park boundary was considerably improved by crowning the road and adding a considerable amount of clay to the sandy soil.

The act of March 4, 1907, provided $10,000 to be spent in the forest reserve on the East and South roads. The work on the East road was done prior to June 30, 1907, and that on the South road began July 15, and was completed about the middle of September. The work on the South road was carried on to a point some 90 miles from the Park boundary and 15 miles from Dubois, Wyo. It consisted mainly in replacing numerous culverts and bridges which had rotted and in crowning and ditching the road.

Necessary repairs were made to the bridge on the East road at Elk Fork, near Wapiti, damaged in the spring of 1908 by high water. Minor repairs were also made to the bridge across the Shoshone, about

3 miles from Wapiti, and along the road some 2 miles farther up where the riprap along the bank had been washed out.

On the Cooke City road considerable work was done from Soda Butte to the Park line. This section of road is through timber, and the soil is black loam, very marshy and swampy. The clearing, which was cut two years before for a relocation of the road, was completed and the road constructed on this new line, about 2 miles long, saving two crossings of the river, and adding materially to the safety and ease of travel, especially during high water.

In the spring of 1908 minor repairs were made along Jackson grade by building up portions of the wall which had fallen, and adding riprap, principally at the junction of Soda Butte Creek and the Lamar River. Several large overhanging rock in the Lamar Canyon were removed, and the approaches to the Lamar Bridge were repaired.

The old road from the Fountain to the Upper Basin was repaired, and minor repairs were made to several culverts for early freighting.

OPENING OF THE SEASON.

The season opened for tourist travel on June 10. The roads were open for travel over the Divide on June 7, and the coaches crossed for the first trip on June 12. The snow was only moderately deep from the Basin to the 14-mile post, but from the 14-mile post to the 18-mile post, which is 1 mile from the Thumb, snow drifts 7 feet deep were encountered. Since the completion of the cabins on the Divide the work of opening the roads has been materially expedited.

Another matter which assisted greatly in opening the roads was the staking the ditches of the road over the Divide. When the snow crews arrived they immediately dug straight ditches between the stakes which had been set at the angle points in the ditch lines. By this means the water was quickly removed from the road, and the snow did not do nearly as much damage as heretofore.

TREATMENT OF ROADS IN SPRING.

The past spring was probably the worst for many years, owing to the heavy rains, which were so excessive and continual that the roads became very muddy, and restrictions were placed on the amount of freight hauled on one wagon and also upon the points to which it would be permitted to be hauled. These restrictions were occasioned by the excessive and unnecessary hauling during the heavy rains by parties doing business in the park, but they were not established until great damage had been done.

Upon the recommendation of the engineer officer in charge the superintendent limited all hauling to the Canyon, Lake, and Thumb to 3,500 pounds per wagon, and in addition thereto also required a permit. To points between Mammoth and Norris and the Basin the limit was 5,000 pounds, and from Gardiner to Mammoth 5,500 pounds per wagon. Frequent attempts have been made in the past to establish such restrictions, but without success. In the future it is proposed to issue such regulations as may be deemed necessary, and sufficiently early in the spring so that material damage to the roads shall be prevented.

Money statement.

July 1, 1907, balance unexpended	$57,443.59
Amount appropriated by sundry civil act approved May 27, 1908	65,000.00
	122,443.59
June 30, 1908, amount expended during fiscal year	55,968.91
July 1, 1908, balance unexpended	66,474.68
July 1, 1908, outstanding liabilities	20,180.59
July 1, 1908, balance available	46,294.09
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance and repairs, in addition to the balance unexpended July 1, 1908	200,000.00

ESTIMATES.

The needs of the improvements for next year require as follows:

General work	$147,500
Bridges	7,500
Sprinkling	30,000
Plant	15,000
	200,000

In this estimate in the term "General work" the following subdivisions of work are contemplated:

Rebuilding dry wall in Gardiner Canyon in mortar	$30,000
Rebuilding dry wall at Gibbon Falls and Canyon	15,000
Rebuilding dry wall at Virginia Cascade	10,000
Rebuilding dry wall in Spring Creek Canyon	5,000
Widening road to Inspiration Point from Canyon Hotel	5,000
Widening Spring Creek-Canyon Upper-Basin Thumb road	5,000
Surfacing roads with traction engine	30,000
General repairs and maintenance	47,500
	147,500

Under the item of $30,000 for sprinkling it is proposed to expend $10,000 in extending the system to those portions not heretofore sprinkled.

Under "Bridges" the following are listed:

	Feet long.
Gibbon River, Norris-Fountain road, 5 miles	105
Gibbon River, Norris-Fountain road, 6¼ miles	80
Herron Creek, Thumb-Basin road, 9¾ miles	95

Under the heading "Plant," it is intended to purchase a traction engine, cars and rock crusher as outlined in Annual Report of 1907.

The above estimate may be reduced to the following if it is the intention of Congress to minimize the expenditure and keep up repairs only, and not to improve present conditions.

IMMEDIATE NEEDS OF THE PARK.

General work	$50,000
Sprinkling	25,000
Bridges (as outlined above)	7,500
	82,500

This sum will only maintain the improvements in their present condition, and its appropriation is urgently recommended. The appro-

priations of the past three years have not been sufficient to meet the wear and tear upon the roads, and it is regretted that they have become worse rather than better. The bridges for which the sum of $7,500 is asked are urgently needed. The item appeared in last year's estimate, but the appropriation is so limited that the work can not be done.

APPROPRIATIONS.

Act.	Administration and protection.	Roads and bridges.	Total.
March 3, 1883	$16,429.97	$23,570.03	$40,000.00
July 7, 1884	16,999.98	23,000.02	40,000.00
March 3, 1885	16,790.63	23,209.37	40,000.00
July 15, 1886	934.25	.....	934.25
August 4, 1886	.....	20,000.00	20,000.00
March 3, 1887	.....	20,000.00	20,000.00
October 2, 1888	.....	25,000.00	25,000.00
March 2, 1889	.....	50,000.00	50,000.00
August 30, 1890	.....	75,000.00	75,000.00
March 3, 1891	.....	75,000.00	75,000.00
August 5, 1892	.....	45,000.00	45,000.00
March 3, 1893	.....	30,000.00	30,000.00
August 18, 1894	.....		30,000.00
March 2, 1895	10,565.24	89,434.76	30,000.00
June 8, 1896	.....		5,000.00
June 11, 1896	.....		35,000.00
June 4, 1897	6,736.74	28,263.26	35,000.00
July 7, 1898	11,356.57	28,643.43	40,000.00
March 3, 1899	5,534.64	34,465.36	40,000.00
June 6, 1900	5,000.00	55,000.00	60,000.00
March 3, 1901	5,000.00	113,000.00	118,000.00
June 28, 1902	5,000.00	250,000.00	255,000.00
March 3, 1903	5,000.00	250,000.00	255,000.00
April 28, 1904	7,500.00	250,000.00	257,500.00
March 3, 1905	7,500.00	133,000.00	140,500.00
June 30, 1906	7,500.00	55,000.00	62,500.00
March 4, 1907	8,000.00	75,000.00	83,000.00
May 27, 1908	10,500.00	65,000.00	75,500.00
Total	146,348.02	1,836,586.23	1,982,934.25
Received from other sources (see money statement, 1903, p. 2892)	.....	210.00	210.00
Received from other sources (see money statement, 1904, p. 4178)	.....	117.80	117.80
Received from other sources (see money statement, 1905, p. 2812)	.....	523.15	523.15
Less amount reverted to Treasury, July, 1904, appropriation 1901-2	146,348.02	1,837,437.18	1,983,785.20
	.....	621.22	621.22
Grand total	146,348.02	1,836,815.96	1,983,163.98

APPENDIX J J J.

ROAD INTO MOUNT RAINIER NATIONAL PARK.

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., July 1, 1908.

SIR: I have the honor to forward herewith annual report for the fiscal year ending June 30, 1908, on road into Mount Rainier National Park.

Very respectfully, your obedient servant,

H. M. CHITTENDEN,
Major, Corps of Engineers.

The CHIEF OF ENGINEERS, U. S. ARMY.

ROAD INTO MOUNT RAINIER NATIONAL PARK.

This work has been in local charge of Mr. Eugene Ricksecker, assistant engineer, from whose reports the following extracts are taken:

The condition of this work on July 1, 1907, was as follows:

From west boundary of forest reserve, station 540, to station 428, 2.1 miles of road, no work was done; from station 428 to 420, 0.2 mile, road incomplete; from station 420 to "0" at Longmire Springs, 7.9 miles, road completed; from station "0" to station 72 above springs, 1.4 miles, road completed. Number of miles in use, 9.5; number of miles to construct (about), 15.5; total, 25 miles.

In addition to this the road was roughed out to station 92 above the springs, or four-tenths of a mile farther. Clearing done to station 129, seven-tenths of a mile farther, and the main camp of the season was being established at Van Trump Creek (station 157). Two hundred and sixteen men and 17 teams were engaged on construction.

Work was carried on from one camp from June 1 until close of season, September 29, 1907. During this period the following was accomplished:

Road completed from station 72 to 227, 2.9 miles, including one overhead hewed timber Howe truss bridge of 75-foot span across Van Trump Creek Canyon. Road nearly completed and open for travel from station 227 to station 266, ¾ mile. Road worked out but impassable for teams from station 266 to station 272, ½ mile. Clearing completed from station 272 to station 330, 1.1 miles.

The average force employed was 160 men and 12 teams.

The work was done under Overseer E. Tivendell.

* * * * * * *

Construction work was resumed on May 5, 1908, under Overseer Thomas Irving, camp being maintained at Copper Creek, 1 mile inside the forest reserve, until June 4, with a force of 45 men and 5 teams.

* * * * * * *

On June 4, the snow having disappeared sufficiently to allow construction in the higher altitudes, the entire force was moved to camp near Nisqually

Glacier (station 264) and took up the work where it was dropped at close of last season and the force increased to 130 men on the 17th.

The road is completed to station 278; the 100-foot span, wooden Howe truss bridge across the Nisqually River at this point is well along and the road roughed out beyond station 300. The number of miles of new road that will be in use June 30 is 14; number of miles on which some work is done, 1.5; number of miles to construct (about), 9.5; total (about), 25 miles.

This mileage marks the completion of the first highway in the United States to reach a great glacier.

The number of tourists who visited the park during the year ending June 30, 1907, is reported by the acting superintendent to be 2,068.

The number of vehicles that entered the park during season of 1907 is estimated at 1,010, of which 60 were automobiles. These machines were permitted to use the roads by the Secretary of the Interior, in conformity with approved rules, after urgent appeal had been made to him by owners of machines, for the first time, August 7, 1907. The privilege was much appreciated and automobilists were enthusiastic over the route opened to them. A neat lodge has recently been completed at the park entrance by the superintendent, where autos may obtain permits, and another is in course of erection at the Springs.

As bearing on the work of improvement in this park, the following extract is quoted from my indorsement of October 21, 1907, upon a report of October 18, 1907, by Mr. Ricksecker to the Secretary of the Interior:

5. The one great attraction of this park is the mountain that gives it its name. The first purpose of the improvement work should therefore be to make this attraction as accessible as possible to tourists. A great many visitors desire to ascend the mountain, and I thoroughly approve the suggestion to do some necessary work to provide for the comfort and safety of parties making the climb. Under present conditions it is necessary to spend one night on a bare rock, without a semblance of shelter or means of essential comfort. The next night is spent in the crater at the summit, where there is a degree of natural warmth but no shelter. At one point on the ascent, viz, at Gibraltar Rock, there is a dangerous passage that should be improved. There ought to be constructed a fairly good trail from the Camp of the Clouds up, and two shelters—one at Camp Muri, at the end of the first stage of the climb, and the other in the crater.

6. A bridle trail around the mountain just under the glacier line is absolutely essential to the proper policing of the park and very necessary for the convenience of tourists if they are really to have access to the attractions of the park. The trail should be so located that in time it may be enlarged into a wagon road.

Three views illustrating the character of work and the scenery along the road already constructed accompany this report.

Money statement.

July 1, 1907, balance unexpended		$57,080.14
Amount appropriated by sundry civil act approved May 27, 1908		50,000.00
		107,080.14
June 30, 1908, amount expended during fiscal year for works of improvement		54,250.57
July 1, 1908, balance unexpended		52,829.57
July 1, 1908, outstanding liabilities		5,000.00
July 1, 1908, balance available		47,829.57
Amount (estimated) required for completion of existing project		25,000.00
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$25,000.00	
For maintenance of improvement	5,000.00	
		30,000.00

GOVERNMENT ROAD ABOVE LONGMIRE SPRINGS, MOUNT RAINIER IN BACKGROUND.

GOVERNMENT ROAD BELOW LONGMIRE SPRINGS, SHOWING SECTION OF DENSE FOREST.

GOVERNMENT ROAD BELOW LONGMIRE SPRINGS, SHOWING TYPICAL BRIDGE OVER SMALL STREAM.

APPENDIX K K K.

OPERATIONS ON BUILDINGS, ARMY WAR COLLEGE, WASHINGTON, D. C., AND ENGINEER POST AND ENGINEER SCHOOL, WASHINGTON, D. C.

REPORT OF LIEUT. COL. W. C. LANGFITT, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

WAR DEPARTMENT, U. S. ENGINEER OFFICE,
CONSTRUCTION OF BUILDINGS, ENGINEER SCHOOL,
Washington Barracks, D. C., July 29, 1908.

SIR: I have the honor to submit herewith my annual report for the year of 1908 on the "Operations on Buildings, Engineer Post and Engineer School, Washington, D. C.," under my charge.

WAR COLLEGE.

This work is entirely finished and the accounts all settled up. For detailed history of this work reference is made to the Annual Reports of the Chief of Engineers for the years 1902, 1903, 1904, 1905, and 1906.

ENGINEER POST AND ENGINEER SCHOOL.

All appropriations heretofore made for construction of buildings for Engineer Post and Engineer School have been expended. The act of March 2, 1907, appropriated $15,000 for completion of two sets of noncommissioned officers' quarters and $17,500 for one new stable.

In the estimates submitted by the then constructing officer for these buildings necessary for completion of the post and school, and upon which the above appropriations were made, the usual and necessary 10 per cent was included in a lump sum for the whole work. Congress, in appropriating for these buildings, did not add their proportionate amount of this 10 per cent. In addition, from experience with other sets of noncommissioned officers' quarters already completed, it was found necessary to add tie-rods at considerable expense. Notwithstanding the smallness of the appropriation as explained and the additional expense of the tie-rods, the two sets of noncommissioned officers' quarters were completed within the sum appropriated and are now occupied. Owing to unexpected greater cost in the foundations to prevent uneven settlement and cracking, the stable

could not be completed. It is estimated that an additional appropriation of $1,700 will be necessary for this purpose—a sum somewhat less than the omitted 10 per cent. The estimated cost for completion of all necessary buildings, roads, etc., is $775,700, which sum should be made available at the earliest date practicable.

For detailed history of this project reference is made to the Annual Report of the Chief of Engineers for the years 1902, 1903, 1904, 1905, and 1906.

The present condition of appropriations for buildings, Engineer School, Washington, D. C., is as follows:

Amount appropriated by act of June 30, 1902	$500,000.00
Amount appropriated by act of March 2, 1903	360,000.00
Amount appropriated by act of March 2, 1905	150,000.00
Amount appropriated by act of March 2, 1907	32,500.00
	1,042,500.00
June 30, 1908, amount expended to date	1,042,424.85
July 1, 1908, balance unexpended	75.15
July 1, 1908, outstanding liabilities	75.15

Very respectfully,

W. C. LANGFITT,
Lieut. Col., Corps of Engineers,
In Charge of Construction.

The CHIEF OF ENGINEERS, U. S. ARMY.

APPENDIX L L L.

CONSTRUCTION OF BRIDGE ACROSS MISSISSIPPI RIVER AT FORT SNELLING, MINNESOTA.

REPORT OF MAJ. FRANCIS R. SHUNK, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

The approved project will be found in the Report of the Chief of Engineers for 1908, part 1, page 901.

Bids for the construction of the bridge were opened June 19, 1907, and, after thorough consideration of the five submitted, that of Bayne & Hewett, of Minneapolis, Minn., was accepted, the price being $230,000. Contract was entered into December 21, 1907. As it was found that the length of piles specified for the center pier foundation was not sufficient, owing to the nature of the subsoil, a supplemental contract was entered into with Bayne & Hewett for driving such piles of extra length as might be considered necessary.

Work on the substructure was commenced early in January, 1908. The skewback piers have been completed. The abutment on the St. Paul side has been completed, and that on the Fort Snelling side is about one-half completed. About 200 of the piles for the center pier have been driven. High water during May and June prevented the completion of the center pier foundation. The substructure is about 64 per cent completed. The steel for the superstructure has all been rolled, inspected, and tested at the mills. Detail drawings for the superstructure have been submitted and, excepting some minor details, approved.

The remaining land required for approaches and right of way has been acquired and an easement obtained over the tracks of the Chicago, Milwaukee and St. Paul Railway Company. The latter, however, has not been definitely approved by the Attorney-General.

This work is under the direct supervision of Mr. Geo. W. Freeman, assistant engineer.

Statement of expenditures during the year.

Land for approaches and right of way	$2,450.95
Contract payments	21,037.50
Administration and superintendence	1,478.03
	24,966.48

Money statement.

July 1, 1907, balance unexpended	$145,871.57
Received from city of St. Paul	100,000.00
	245,871.57
June 30, 1908, amount expended during fiscal year	24,966.48
July 1, 1908, balance unexpended	220,905.09
July 1, 1908, outstanding liabilities	3,592.50
July 1, 1908, balance available	217,312.59
July 1, 1908, amount covered by uncompleted contracts	208,962.50

APPROPRIATIONS.

March 4, 1906		$125,000
Other funds:		
From city of St. Paul	$100,000	
From Twin City Rapid Transit Company	25,000	
		125,000
Total		250,000

APPENDIX M M M.

ERECTION OF MONUMENT TO THE MEMORY OF THE AMERICAN SOLDIERS WHO FELL IN THE BATTLE OF NEW ORLEANS IN THE WAR OF 1812.

REPORT OF MAJ. JAMES F. McINDOE, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

For history of monument, project, and reference to act of Congress making the appropriation, see summary, page 902.

Under authority of the Chief of Engineers, dated June 27, 1907, Mr. Alf. F. Theard, civil engineer and architect, whose design for the completion of the monument had been approved by the Secretary of War May 17, 1907, was employed to prepare, under direction of this office, the necessary plans and specifications. For this work he was to be paid $1,000.

Under project approved July 6, 1907, the plans and specifications were submitted for approval August 30, 1907; the work was advertised and bids were opened November 14, 1907. Contract for the completion of the monument was entered into December 7, 1907, and was approved January 2, 1908. Actual work at the monument was commenced by the contractor on January 16, 1908. At the end of the fiscal year the total work completed was: 114.01 cubic yards of brickwork, at $29.20 per cubic yard; 40.15 cubic yards of brickwork in base, at $36.75 per cubic yard; 787.427 cubic feet of marble in shaft and pyramid, at $5 per cubic foot; 650 cubic feet of marble in base of monument, at $6 per cubic foot; 57.76 cubic feet of marble sills and caps, at $6.60 per cubic foot; 429 square feet of marble veneer, at $1.45 per square foot; 25.5 square yards of concrete-steel slabs, at $11.10 per square yard; 8.56 square yards of concrete pavement, at $2 per square yard; 396.5 square yards cement coating for inside walls, at $1 per square yard; 3,775.2 square feet of old marble facing cleaned, at $0.40 per square foot; joints in 3,775.2 square feet of old marble repointed, at $0.05 per square foot; 2,209 pounds of cast-iron steps in place and painted, at $0.15 per pound; 2,075 cubic yards excavation, at $0.95 per cubic yard.

Money statement.

Amount appropriated by act approved March 4, 1907	$25,000.00
Amount received—sale of blueprints	.75
	25,000.75
June 30, 1908, amount expended during fiscal year	12,869.56
July 1, 1908, balance unexpended	12,131.19
July 1, 1908, amount covered by uncompleted contracts	9,264.75

APPROPRIATION.

March 4, 1907	$25,000.00
Sale of blueprints	.75
Total	25,000.75

CONTRACTS IN FORCE.

Name and address of contractor: M. P. Doullut, New Orleans, La.
Work: Completion of monument to memory of American soldiers who fell in the battle of New Orleans, at Chalmette, La., in the war of 1812.
Unit prices: Brickwork, $29.20 per cubic yard; marble in place, face of shaft and pyramid, $5 per cubic foot; base of monument $4.70 per cubic foot; sills and caps $6.60 per cubic foot; marble veneer or slabs in place in walls of observation chamber, $1.45 per square foot; concrete slabs, $11.10 per square yard; concrete pavement, $2 per square yard; cement coating, $1 per square yard; cleaning old marble facing, 40 cents per square foot; cast-iron steps in place, 15 cents per pound; excavation, 95 cents per cubic yard; bronze door, hand rails, etc., at $1,500 for the lot.
Date of approval: January 2, 1908.
Date of beginning work: January 16, 1908.
Date of expiration: April 6, 1909.

Name and address of contractor: M. P. Doullut, New Orleans, La.
Work: Repointing joints in old masonry.
Unit price: 5 cents per square foot.
Date of approval: Supplemental contract, approved by Chief of Engineers, March 7, 1908, by Assistant Secretary of War, March 9, 1908.
Date of beginning work: April, 1908.
Date of expiration: April 6, 1909. Work completed in May, 1908.

Name and address of contractor: M. P. Doullut, New Orleans, La.
Work: Modification of plan of base, reducing amount of marble and brickwork and excavation.
Unit prices: Marble in place, $6 per cubic foot; brickwork, $36.75 per cubic yard.
Date of approval: Supplemental contract, approved by Acting Chief of Engineers, June 23, 1908, by Assistant Secretary of War, June 30, 1908.
Date of beginning work: June, 1908.
Date of expiration: April 6, 1909.

APPENDIX N N N.

MONUMENT TO COMMEMORATE THE BATTLE OF KINGS MOUNTAIN, SOUTH CAROLINA.

REPORT OF CAPT. E. R. STUART, CORPS OF ENGINEERS, OFFICER IN CHARGE, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

By act of Congress approved June 16, 1906, the sum of $30,000 was appropriated for the erection of a monument and an inclosure for same on Kings Mountain, York County, S. C., to commemorate the victory of the American forces at that place October 7, 1780.

After consideration it was recommended and approved that the firm of McKim, Mead & White, architects, New York City, be employed to prepare designs and specifications for this monument. The type of monument decided upon is an obelisk bearing four tablets, for inscriptions, within an inclosure.

Specifications were prepared and approved, and bids opened April 23, 1908, for the construction of this monument, and contract was awarded to The Southern Marble and Granite Company, Spartanburg, S. C., to construct a monument 115 feet 3 inches high, of granite from the quarry of The North Carolina Granite Corporation, Mount Airy, N. C., for the sum of $25,000.

At the close of the fiscal year the plan of the monument had been approved, the inscriptions for the bronze tablets had received the approval of the Secretary of War, and everything was in readiness for the construction of the monument; the contractor had built storage sheds and office on the site, and ground had been broken for the excavation for the foundation on June 23.

Money statement.

July 1, 1907, balance unexpended	$29,927.77
June 30, 1908, amount expended during fiscal year	617.39
July 1, 1908, balance unexpended	29,310.38
July 1, 1908, outstanding liabilities	170.94
July 1, 1908, balance available	29,139.44
July 1, 1908, amount covered by uncompleted contracts	25,000.00

CONTRACT IN FORCE.

Name of contractor: The Southern Marble and Granite Company.
Contract for: Construction of monument.
Price: $25,000.
Date of contract: June 4, 1908.
Date of beginning: July 19, 1908.
Date of expiration: March 19, 1909.

APPENDIX O O O.

LAWS

AFFECTING

THE CORPS OF ENGINEERS, UNITED STATES ARMY.

SIXTIETH CONGRESS, FIRST SESSION, 1907-1908.

CHAP. 1.—An Act To authorize the county of Saint Francis, in the State of Arkansas, to construct a bridge across Saint Francis River at or near the town of Madison, in said county and State.

January 16, 1908. [H. R. 194.] [Public, No. 1.] Vol. 35, p. 1.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Saint Francis, one of the counties of the State of Arkansas, duly created and organized under the laws of said State, be, and it is hereby, authorized to construct, maintain, and operate a bridge and approaches thereto, across the Saint Francis River, at or near the town of Madison, in said county and State, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

St. Francis River. St. Francis County may bridge, at Madison, Ark.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 16, 1908.

CHAP. 2.—An Act To amend an Act entitled "An Act to authorize Washington and Westmoreland counties, in the State of Pennsylvania, to construct and maintain a bridge across the Monongahela River, in the State of Pennsylvania," approved February twenty-first, nineteen hundred and three.

January 20, 1908. [H. R. 9087.] [Public, No. 2.] Vol. 35, p. 1.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section seven of an Act entitled "An Act to authorize Washington and Westmoreland counties, in the State of Pennsylvania, to construct and maintain a bridge across the Monongahela River, in the State of Pennsylvania," approved February twenty-first, nineteen hundred and three, as amended by the Acts approved

Monongahela River, Pa. Time extended for bridging, by Washington and Westmoreland counties, Pa.

Vol. 32, p. 851.

Vol. 33, p. 604. Vol. 34, p. 17. Vol. 34, p. 876, amended.

January eleventh, nineteen hundred and five, February twenty-first, nineteen hundred and six, and February fifth, nineteen hundred and seven, be, and is hereby, further amended to read as follows:

Time of construction.

"SEC. 7. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from February twenty-first, nineteen hundred and eight."

Approved, January 20, 1908.

January 23, 1908. [H. R. 251.] [Public, No. 3.] Vol. 35, p. 2.

CHAP. 3.—An Act To amend an Act entitled "An Act to authorize the city of Saint Louis, a corporation organized under the laws of the State of Missouri, to construct a bridge across the Mississippi River," approved February sixth, nineteen hundred and seven.

Mississippi River. Time extended for bridging, by Saint Louis, Mo. Vol. 34, p. 883, amended.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Saint Louis shall have authority to construct the bridge mentioned in the Act entitled "To amend an Act to authorize the city of Saint Louis, a corporation organized under the laws of the State of Missouri, to construct a bridge across the Mississippi River," approved February sixth, nineteen hundred and seven, under and subject to the limitations and restrictions mentioned in the Act entitled "An Act to authorize the city of Saint Louis, a corporation organized under the laws of the State of Missouri, to construct a bridge across the Mississippi River," approved June twenty-fifth, nineteen hundred and six, if the actual construction of the bridge therein authorized shall be commenced within one year from the approval of this Act and completed within three years from same date.

Vol. 34, p. 461. Time of construction.

Approved, January 23, 1908.

January 23, 1908. [H. R. 4891.] [Public, No. 4.] Vol. 35, p. 2.

CHAP. 4.—An Act To authorize the city of Burlington, Iowa, to construct a bridge across the Mississippi River.

Mississippi River. Burlington, Iowa, may bridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Burlington, Iowa, a corporation organized under the laws of the State of Iowa, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a railroad and wagon bridge and approaches thereto across the Mississippi River at Burlington, in the State of Iowa, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Location. Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, January 23, 1908.

CHAP. 5.—An Act To authorize the Nashville and Northeastern Railroad Company to construct a bridge across Cumberland River at or near Celina, Tennessee.

January 23, 1908. [H. R. 10519.]

[Public, No. 5.] Vol. 35, p. 2.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Nashville and Northeastern Railroad Company, a corporation organized under the laws of the State of Tennessee, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a railroad bridge and approaches thereto across the Cumberland River at or near Celina, in the State of Tennessee, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Cumberland River. Nashville and Northeastern Railroad Company may bridge at Celina, Tenn.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, January 23, 1908.

CHAP. 7.—An Act To authorize the construction of a drawbridge over the Black River in Lawrence County, Arkansas.

February 1, 1908. [S. 2694.]

[Public, No. 7.] Vol. 35, p. 3.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Maxwell Coffin and his assigns are hereby authorized to construct a railroad and wagon drawbridge across Black River at or near the town of Powhatan, in the county of Lawrence and State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Black River. Maxwell Coffin may bridge, at Powhatan, Ark.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 1, 1908.

CHAP. 8.—An Act To amend an Act entitled "An Act permitting the building of a dam across the Mississippi River near the village of Bemidji, in Beltrami County, Minnesota," approved March third, nineteen hundred and five.

February 1, 1908. [H. R. 7606.]

[Public, No. 8.] Vol. 35, p. 3.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time limited in which to complete the dam authorized by the Act entitled "An Act permitting the building of a dam across the Mississippi River near the village of Bemidji, Beltrami County, Minnesota," approved March third, nineteen hundred and five, be, and the same is hereby, extended for a period of one year.

Mississippi River. Time extended for damming, by Kirby Thomas, etc., at Bemidji, Minn. Vol. 33, p. 1044, amended.

Approved, February 1, 1908.

February 1, 1908. [H. R. 9121.]

[Public, No. 9.] Vol. 35, p. 3.

CHAP. 9.—An Act To authorize a bridge across the Missouri River at or near Council Bluffs, Iowa.

Missouri River. Central Railroad and Bridge Company may bridge, at Council Bluffs, Iowa.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Central Railroad and Bridge Company of Council Bluffs, Iowa, a corporation organized under the laws of the State of Iowa, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a railway bridge and approaches thereto across the Missouri River at or near Council Bluffs, Iowa, and may, in connection therewith, construct and maintain a way for wagons, carriages, vehicles, street cars, animals, and foot passengers in the State of Iowa or in Iowa and Nebraska, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendments.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 1, 1908.

February 1, 1908. [H. R. 11330.]

[Public, No. 10.] Vol. 35, p. 4.

CHAP. 10.—An Act To authorize the Chicago, Indiana and Southern Railroad Company to construct and maintain a bridge across the Grand Calumet River in the town of Gary, Indiana.

Grand Calumet River. Chicago, Indiana, and Southern Railroad Company may bridge, at Gary, Ind.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Chicago, Indiana and Southern Railroad Company, a corporation of the State of Indiana, is hereby authorized to construct, maintain, and operate a bridge across the Grand Calumet River at a point in the town of Gary, Lake County, Indiana, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 1, 1908.

February 1, 1908. [H. R. 11331.]

[Public, No. 11.] Vol. 35, p. 4.

CHAP. 11.—An Act To authorize the Baltimore and Ohio and Chicago Railroad Company to construct a bridge across the Grand Calumet River at or near the town of Gary, Indiana.

Grand Calumet River. Baltimore and Ohio and Chicago Railroad Company may bridge, at Gary, Ind.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Baltimore and Ohio and Chicago Railroad Company, a consolidated corporation of the States of Ohio and Indiana, is hereby authorized to construct, maintain, and operate a bridge across the Grand Calumet River at or near the town of Gary, Lake County, Indiana, in accordance with the provisions of an Act entitled "An

Vol. 34, p. 84.

Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 1, 1908.

CHAP. 12.—An Act To authorize the Missouri and North Arkansas Railroad Company to construct a bridge across Cache River, in Woodruff County, Arkansas.

February 1, 1908. [H. R. 12412.] [Public, No. 12.] Vol. 35, p. 4.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Missouri and North Arkansas Railroad Company, a corporation organized under the laws of the State of Arkansas, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Cache River at a point suitable to the interests of navigation, in section twenty-one, township five north, range three west, in Woodruff County, in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Cache River. Missouri and North Arkansas Railroad Company may bridge, in Woodruff County, Ark.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 1, 1908.

CHAP. 14.—An Act To authorize the court of county commissioners of Geneva County, Alabama, to construct a bridge across the Choctawhatchee River at or near the Jones Old Ferry, in Geneva County, Alabama.

February 4, 1908. [H. R. 9210.] [Public, No. 13.] Vol. 35, p. 5.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the court of county commissioners of Geneva County, Alabama, its successors and assigns, be and they are hereby, authorized to construct, maintain, and operate a steel drawbridge and approaches thereto, across the Choctawhatchee River, at or near the Jones Old Ferry, about six miles above the two of Geneva, in Geneva County, in the State of Alabama, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Choctawhatchee River. Geneva County may bridge, at Jones Old Ferry, Ala.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 4, 1908.

February 4, 1908. [H. R. 12439.]

CHAP. 15.—An Act Authorizing the construction of a bridge across White River, Arkansas.

[Public, No. 14.] Vol. 35, p. 5.

White River. Missouri and North Arkansas Railroad Company may bridge, at Negro Hill Landing, Ark.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Missouri and North Arkansas Railroad Company, a corporation organized under the laws of the State of Arkansas, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge, and approaches thereto, across the White River at or near Negro Hill Landing ,Arkansas, in township six north, range four west, at a point suitable to navigation interests, in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 4, 1908.

February 6, 1908. [S. 2662.]

CHAP. 16.—An Act To authorize the Arizona and California Railway Company to construct a bridge across the Colorado River at Parker, Arizona Territory.

[Public, No. 15.] Vol. 35, p. 5.

Colorado River. Arizona and California Railway Company may bridge, at Parker, Ariz.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Arizona and California Railway Company, a corporation organized under the laws of the Territory of Arizona, its successors and assigns, be, and they are hereby authorized to construct, maintain, and operate a bridge and approaches thereto across the Colorado River, at or near Parker, in the Territory of Arizona, as may be approved by the Secretary of War, for the passage of railroad trains by means of a single or double track, and also at the option of said company, its successors and assigns, to be used for the passage of wagons, vehicles, street cars, animals, and persons on foot and in vehicles, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 35, p. 166. *Post*, 2592.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 6, 1908.

February 13, 1908. [S. 2929.]

CHAP. 23.—An Act To authorize the Idaho and Washington Northern Railroad to construct a bridge across the Pend d'Oreille River in the State of Washington.

[Public, No. 22.] Vol. 35, p. 7.

Pend Oreille River.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Idaho and Washington Northern Railroad,

a corporation organized under the laws of the State of Idaho, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a railroad bridge and approaches thereto across the Pend d'Oreille River, near Newport, in Stevens County, in the State of Washington, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Idaho and Washington Northern Railroad may bridge at Newport, Wash.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 13, 1908.

CHAP. 27.—An Act Making appropriations to supply urgent deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and eight, and for prior years, and for other purposes.

February 15, 1908. [H. R. 14766.] [Public, No. 24.] Vol. 35, pp. 8, 27, 28.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in the appropriations for the fiscal year nineteen hundred and eight, and for prior years, and for other objects hereinafter stated, namely:

Urgent deficiencies appropriations.

* * * * *

SEC. 2. That for the payment of the following claims, certified to be due by the several accounting officers of the Treasury Department under appropriations the balances of which have been exhausted or carried to the surplus fund under the provisions of section five of the Act of June twentieth, eighteen hundred and seventy-four, and under appropriations heretofore treated as permanent, being for the service of the fiscal year nineteen hundred and five and prior years, unless otherwise stated, and which have been certified to Congress under section two of the Act of July seventh, eighteen hundred and eighty-four, as fully set forth in House Document Numbered Three hundred and seventy-three, reported to Congress at its present session, there is appropriated as follows:

Claims certified by accounting officers.

Vol. 18, p. 110.

Vol. 23, p. 254.

* * * * *

CLAIMS ALLOWED BY THE AUDITOR FOR THE WAR DEPARTMENT.

Claims allowed by Auditor for War Department.

* * * * *

For contingencies of fortifications at Memphis, Tennessee, six dollars and seventy-eight cents.

Fortifications, Memphis, Tenn.

* * * * *

Approved, February 15, 1908.

February 20, 1908. [H. R. 13430.]

[Public. No. 25.]

Vol. 35, p. 32.

CHAP. 28.—An Act To authorize the Chicago, Indianapolis and Louisville Railway Company to construct a bridge across the Grand Calumet River in the city of Hammond, Indiana.

Grand Calumet River.

Chicago, Indianapolis and Louisville Railway Company, may bridge at Hammond, Ind.

Vol. 34, p. 84.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Chicago, Indianapolis and Louisville Railway Company, a corporation of the State of Indiana, is hereby authorized to construct, maintain, and operate a bridge across the Grand Calumet River at a point in or near the city of Hammond, Lake County, Indiana, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 20, 1908.

February 20, 1908. [H. R. 14040.]

[Public, No. 26.]

Vol. 35, p. 33.

CHAP. 29.—An Act To authorize the county of Ashley, State of Arkansas, to construct a bridge across Bayou Bartholomew, at a point above Morrell, in said county and State, the dividing line between Drew and Ashley counties.

Bayou Bartholomew, Ashley County may bridge near Morrell, Ark.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Ashley be, and it is hereby, authorized to construct, maintain, and operate a steel drawbridge and approaches thereto across Bayou Bartholomew, a navigable river, at a point above Morrell, in said county and State, the dividing line between Drew and Ashley counties, in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, February 20, 1908.

February 20, 1908. [H. R. 14781.]

[Public, No. 27.]

Vol. 35, p. 33.

CHAP. 30.—An Act To authorize Campbell County, Tennessee, to construct a bridge across Powells River.

Powells River.

Campbell County may bridge near Agee, Tenn.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Campbell County, Tennessee, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto, across the Powells River at or near its mouth, near Agee post-office, in Campbell County, in the State of Tennessee, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges

Vol. 34, p. 84.

over navigable waters," approved March twenty-third, nineteen hundred and six.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 20, 1908.

CHAP. 31.—An Act To authorize the Interstate Transfer Railway Company to construct a bridge across the Saint Louis River between the States of Wisconsin and Minnesota.

February 20, 1908. [H. R. 16050.]

[Public, No. 28.] Vol. 35, p. 33.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Interstate Transfer Railway Company, a corporation organized under the laws of the State of Wisconsin, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a railroad bridge and approaches thereto across the Saint Louis River between the States of Wisconsin and Minnesota at the most feasible point in section twelve, in township forty-eight north, range fifteen west, in the State of Wisconsin, to a point opposite in section eleven, in township forty-eight north, range fifteen west, in the State of Minnesota, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges across navigable waters," approved March twenty-third, nineteen hundred and six: *Provided*, That said bridge shall be constructed with two through decks, one of which shall provide for the passage of wagons and vehicles, for all kinds of street railway and motor cars, and road travel, and one of which shall also have two passageways, one on either side, for the exclusive use of pedestrians, each passageway to be not less than three and one-half feet in width and to be separated from the roadway or railway on said deck by suitable guard railings, and all parts of said bridge shall be forever maintained in accessible and serviceable condition, and the use thereof shall be forever free and without toll or compensation therefor to all pedestrians and vehicles, but not free for steam or electric railroad cars and locomotives or street cars.

St. Louis River, Wis., and Minn. Interstate Transfer Railway Company may bridge. Location. Vol. 34, p. 84. Proviso. Construction. Toll.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, February 20, 1908.

CHAP. 37.—An Act To extend the time for the completion of a bridge across the Missouri River at Yankton, South Dakota, by the Yankton, Norfolk and Southern Railway Company.

February 25, 1908. [S. 417.]

[Public, No. 33.] Vol. 35, p. 35.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section six of the Act approved March ninth,

Missouri River.
Time extended for bridging, at Yankton, S. Dak., by Yankton, Norfolk and Southern Railway Company.
Vol. 33, pp. 62, 621.
Vol. 34, pp. 9 1058, amended.
Time of construction.

nineteen hundred and four, authorizing the Yankton, Norfolk and Southern Railway Company to construct a combined railroad, wagon, and foot-passenger bridge across the Missouri River at or near the city of Yankton, South Dakota, as amended by the Acts approved January twenty-seventh, nineteen hundred and five; February fifth, nineteen hundred and six, and March second, nineteen hundred and seven, be, and is hereby, amended by extending the time for commencing the construction of said bridge to March ninth, nineteen hundred and nine, and by extending the time for completing said bridge to March ninth, nineteen hundred and eleven.

Approved, February 25, 1908.

February 26, 1908.
[H. R. 12401.]

CHAP. 52.—An Act To legalize a bridge across the Mississippi River at Rice, Minnesota.

[Public, No. 35.]
Vol. 35, p. 36.
Mississippi River.
Bridge across, at Rice, Minn., legalized, etc.
Proviso.
Changes.
Amendment.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the bridge constructed across the Mississippi River at the village of Rice, Benton County, Minnesota, by the authorities of said village, be, and the same is hereby, legalized, and the consent of Congress is hereby given to its maintenance by said authorities: *Provided*, That any changes in the said structure which the Secretary of War may at any time deem necessary and order in the interest of navigation shall be promptly made by the owners thereof at their own expense.

SEC. 2. That the right to alter, amend, or repeal this act is hereby expressly reserved.

Approved, February 26, 1908.

February 29, 1908.
[S. 3726.]

CHAP. 55.—An Act To authorize the Twin City Power Company to build, operate, and maintain three dams across the Savannah River, above the city of Augusta, in the State of Georgia.

[Public, No. 36.]
Vol. 35, p. 36.
Savannah River.
Twin City Power Company may dam.
Dortons Creek, S. C.
Prices Island, S. C.
Vol. 34, p. 386.
Proviso.
Time of completion.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Twin City Power Company, a corporation organized under the laws of the State of South Carolina, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a dam across the Savannah River, at or near where Dortons Creek, in the county of Edgefield, State of South Carolina, empties into the Savannah River, and also a dam across the said river at or near the southern end of Prices Island, in said river, and about five miles from the mouth of Dortons Creek, in the State of South Carolina, in accordance with the provisions of the Act entitled "An Act to regulate the construction of dams across navigable waters," approved June twenty-first, nineteen hundred and six: *Provided*, That one of said dams shall be completed within three

years and the other within five years from the passage of this Act.

SEC. 2. That the said Twin City Power Company is authorized to construct, operate, and maintain a dam across the Savannah River at what is known as Crouchs Bluff, in Edgefield County, South Carolina: *Provided*, That the said site at Crouchs Bluff can be obtained by contract from the owners thereof: *And provided further*, That said dam at Crouchs Bluff shall be constructed under the provisions of the said Act of June twenty-first, nineteen hundred and six: *Provided further*, That said dam if constructed at Crouchs Bluff shall be completed within three years.

Crouchs Bluff.

Provisos.

Site.

Vol. 34, p. 386.

Time of completion.

SEC. 3. That the Act entitled "An Act authorizing the Twin City Power Company to build two dams across the Savannah River, above the city of Augusta, in the State of Georgia," approved February twenty-seventh, nineteen hundred and seven, be, and the same is hereby, repealed.

Repeal of former act.

Vol. 34, p. 1000.

SEC. 4. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, February 29, 1908.

CHAP. 57.—An Act To authorize the Cahaba Power Company, a corporation organized under the laws of the State of Alabama, to construct a dam across the Cahaba River, in said State, at or near Centerville, Alabama.

March 6, 1908.
[H. R. 16051.]
[Public, No. 38.]
Vol. 35, p. 37.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Cahaba Power Company, a corporation organized under the laws of Alabama, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a dam across the Cahaba River at Centerville, in the State of Alabama, in accordance with the provisions of the Act entitled "An Act to regulate the construction of dams across navigable waters," approved June twenty-first, nineteen hundred and six.

Cahaba River.

Cahaba Power Company may dam, at Centerville, Ala.

Vol. 34, p. 386.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved

Amendment.

Approved, March 6, 1908.

CHAP. 58.—An Act To extend the time for building a bridge across Red River at Shreveport, Louisiana.

March 6, 1908.
[H. R. 16955.]
[Public, No. 39.]
Vol. 35, p. 37.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section five of the Act of Congress approved February third, nineteen hundred and five, entitled "An Act to authorize the construction of a bridge across Red

Red River.

Time extended for bridging, by Shreveport, La.

Vol. 33, p. 630, amended.

River at Shreveport, Louisiana," be, and is hereby, amended to read as follows:

Time of completion.

"SEC. 5. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from February third, nineteen hundred and eight."

Approved, March 6, 1908.

March 6, 1908. [H. R. 17227.] [Public, No. 40.] Vol. 35, p. 38.

CHAP. 59.—An Act To authorize the city of Saint Joseph, Michigan, to construct a bridge across the Saint Joseph River at or near its mouth.

St. Joseph River. St. Joseph, Mich., may bridge.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Saint Joseph, Michigan, a corporation organized under the laws of the State of Michigan, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Saint Joseph River, at or near its mouth, in Berrien County, in the State of Michigan, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Location.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 6, 1908.

March 6, 1908. [H. J. R. 120.] [Pub. Res., No. 12.] Vol. 35, p. 569.

[No. 12.] Joint Resolution Authorizing the Secretary of War to apply the unexpended balance of the donation made by the citizens of Dallas, Texas, under the provisions of the river and harbor Act of March third, nineteen hundred and five, to work in construction of Lock and Dam Numbered Two in section one of Trinity River.

Trinity River. Lock and Dam Numbered Two. Use of unexpended donation authorized. Vol. 33, p. 1131.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the unexpended balance of the sum of sixty-six thousand dollars, donated to the United States by citizens of Dallas, Texas, in pursuance of a provision in the river and harbor Act of March third, nineteen hundred and five, to aid in the improvement of section one, Trinity River, is hereby made available for the construction of locks and dams, and the Secretary of War may, in his discretion, apply the said balance to work in connection with the construction of Lock and Dam Numbered Two in said section one.

Approved, March 6, 1908.

CHAP. 61.—An Act To authorize the counties of Henry and Rock Island, in the State of Illinois, to construct a bridge across Rock River at or near Colona Ferry, in said State.

March 7, 1908. [H. R. 17422.]

[Public No. 42.] Vol. 35, p. 39.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the counties of Henry and Rock Island, in the State of Illinois, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Rock River at or near Colona Ferry, in the State of Illinois, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Rock River. Henry and Rock Island counties, Ill., may bridge, at Colona Ferry.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 7, 1908.

CHAP. 62.—An Act To amend an Act entitled "An Act to authorize the Fayette Bridge Company to construct a bridge over the Monongahela River, Pennsylvania, from a point in the borough of Brownsville, Fayette County, to a point in the borough of West Brownsville, Washington County," approved April twenty-third, nineteen hundred and six.

March 7, 1908. [H. R. 17220.]

[Public No. 43.] Vol. 35, p. 39.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section seven of an Act entitled "An Act to authorize the Fayette Bridge Company to construct a bridge over the Monongahela River, Pennsylvania, from a point in the borough of Brownsville, Fayette County, to a point in the borough of West Brownsville, Washington County," approved April twenty-third, nineteen hundred and six, be, and is hereby, amended to read as follows:

Monongahela River. Time extended for bridging, by Fayette Bridge Company.

Vol. 34, pp. 130, 1236, amended.

"SEC. 7. That this Act shall be null and void unless the construction of said bridge shall be commenced within one year from April twenty-third, nineteen hundred and eight, and shall be completed by April twenty-third, nineteen hundred and eleven."

Time of completion.

SEC. 2. That the bridge to be constructed under the provisions of said Act shall be constructed in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Construction.

Vol. 34, p. 84.

SEC. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 7, 1908.

March 10, 1908. [H. R. 6195.] [Public, No. 47.] Vol. 35, p. 40.

CHAP. 77.—An Act To authorize A. J. Smith and his associates to erect a dam across the Choctawhatchee River in Dale County, Alabama.

Choctawhatchee River. Andrew J. Smith et al. may dam. Location.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That Andrew J. Smith and his associates, their successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a dam across the Choctawhatchee River about one-eighth of a mile below or west of the bridge across said river on the road known as the Newton and Ozark public road, in Dale County, in the State of Alabama, in accordance with the provisions of the Act entitled "An Act to regulate the construction of dams across navigable waters," approved June twenty-first, nineteen hundred and six.

Vol. 34, p. 386.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 10, 1908.

March 10, 1908. [H. R. 15247.] [Public, No. 48.] Vol. 35, p. 40.

CHAP. 78.—An Act To authorize the Idaho and Northwestern Railway Company to construct a bridge across the Spokane River near the city of Coeur d'Alene, Idaho.

Spokane River. Idaho and Northwestern Railway Company may bridge, at Coeur d'Alene, Idaho.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Idaho and Northwestern Railway Company, a corporation of the State of Idaho, is hereby authorized to construct, maintain, and operate a bridge across the Spokane River at a point near the city of Coeur d'Alene, Kootenai County, Idaho, in accordance with the provisions of an Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, March 10, 1908.

March 11, 1908. [S. 4351.] [Public, No. 50.] Vol. 35, p. 41.

CHAP. 80.—An Act for the relief of the Alaska Pacific Railway and Terminal Company.

Alaska Pacific Railway and Terminal Company. Time extended for completing road. Vol. 30, p. 410.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time of the Alaska Pacific Railway and Terminal Company to comply with the provisions of sections four and five of chapter two hundred and ninety-nine of the laws of the United States, entitled "An Act extending the homestead laws and providing for the right of way for railroads in the district of Alaska, and for other purposes," approved May fourteenth, eighteen hundred and ninety-eight, in acquiring and completing its

railroad now under construction in Alaska is hereby extended, as follows:

First. The time to file the map and profile of definite location of its second section of at least twenty miles with the register of the land office in the district of Alaska, as provided in said sections four and five, is hereby extended to and including the eighteenth day of March, nineteen hundred and nine.

Filing maps, etc. Vol. 30, p. 410.

Second. The time to complete the first section of at least twenty miles of its railroad, as provided in said section five, is hereby extended to and including the eighteenth day of March, nineteen hundred and nine, and such railroad company shall be entitled to all the benefits conferred upon it by the provisions of such Act upon its due compliance with all the provisions thereof, excepting only the provisions thereof relating to the filing of the map and profile of definite location of its second section of not less than twenty miles of its road: *Provided*, That it shall have, successively, one year each after said eighteenth day of March, nineteen hundred and nine, in which to file the map and profile of its definite location of the succeeding sections of not less than twenty miles each: *And provided further*, That it shall have five years in which to complete its entire line.

Completion of twenty miles of first section. Time extended to March 18, 1909.

Provisos. Filing map of other sections.

Time of completion of entire line.

Approved, March 11, 1908.

CHAP. 82.—An Act To authorize the county of Elmore, Alabama, to construct a bridge across Coosa River, Alabama.

March 12, 1908. [H. R. 13102.] [Public, No. 52.] Vol. 35, p. 42.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Elmore, Alabama, be, and it is hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Coosa River at or near Wetumpka, in the State of Alabama, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six: *Provided*, That any bridge constructed under this Act shall be erected at sufficient height above the water of said river at high and low water stage to permit the free and easy passage of steamboats and other watercrafts navigating and accustomed to navigate the Alabama and Coosa Rivers, or shall be constructed a drawbridge subject to such regulations for the security of navigation below the Coosa and Alabama Rivers as the Secretary of War may prescribe.

Coosa River. Elmore County, Ala., may bridge, at Wetumpka.

Vol. 34, p. 84.

Proviso. Construction.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 12, 1908.

March 16, 1908. [S. 1931.] [Public, No. 54.] Vol. 35, p. 43.

CHAP. 86.—An Act To grant certain land, part of the Fort Niobrara Military Reservation, Nebraska, to the village of Valentine for a site for a reservoir or tank to hold water to supply the public of said village.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby granted to the village of Valentine, a duly incorporated municipality under the statutes of the State of Nebraska, an easement in, on, and over the northwest quarter and the north half of the southwest quarter of section thirty, township thirty-four north, range twenty-seven west, sixth principal meridian, in the State of Nebraska, the same being now a part of the Fort Niobrara Military Reservation, the property of the United States, for the purpose of supplying to said village and its inhabitants water from a stream thereon, with the privilege to erect, construct, and maintain a dam, reservoir, and other facilities proper and convenient to the enjoyment of such easement: *Provided*, That the said tract shall be used by said village in supplying water to said village and its inhabitants, and not for other purposes: *Provided further*, That this privilege shall not interfere with any existing vested right.

Valentine, Nebr. Granted land for water-supply purposes. Description.

Provisos. Restrictions.

Prior rights not affected.

Approved, March 16, 1908.

March 16, 1908. [S. 2948.] [Public, No. 55.] Vol. 35, p. 43.

CHAP. 87.—An Act To provide additional station grounds and terminal facilities for the Arizona and California Railway Company in the Colorado River Indian Reservation, Arizona Territory.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That subject to the approval of the Secretary of the Interior, additional lands not exceeding forty acres in area adjacent to its approved right of way in the Colorado River Indian Reservation, in the Territory of Arizona, be, and the same are hereby, granted for additional station grounds and terminal facilities to the Arizona and California Railway Company, a corporation organized under the laws of said Territory, subject to the payment by said company of full compensation therefor in the manner provided in section three of the Act approved March second, eighteen hundred and ninety-nine, entitled "An Act to provide for the acquiring of rights of way by railroad companies through Indian reservations, Indian lands, Indian allotments, and for other purposes:" *Provided*, That such additional lands are granted subject to the right of the United States to cross the same and the works constructed thereon, with canals or water conduits of any kind or with roadways, or transmission lines for telephone, telegraph, or electric power, which may in the future be built by the United States across such lands;

Arizona and California Railway Company. Granted additional land in Colorado River Indian Reservation, Ariz.

Vol. 30, p. 991.

Proviso. Rights reserved.

and the said company shall build and maintain at its own expense all structures that may be required at crossings, and in accepting this grant shall release the United States from all damages which may result from the construction and use of such crossings, canals, conduits, and lines.

Structures at crossings.

Damages.

Approved, March 16, 1908.

CHAP. 90.—An Act To authorize the town of Edgecomb, Lincoln County, Maine, to maintain a free bridge across tide waters.

March 16, 1908.
[H. R. 16073.]

[Public, No. 58.]
Vol. 35, p. 44.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the town of Edgecomb, in the county of Lincoln and State of Maine, is hereby authorized to maintain a free bridge in the manner and according to the plans thereof which have been heretofore approved by the Secretary of War, and with all the rights to build, rebuild, and maintain the same which would have existed if the same had been regularly authorized prior to its construction, said bridge extending across a cove on the easterly side of Sheepscot River in said Edgecomb between upland belonging to John P. Chase, formerly belonging to Norris and Gay, and upland belonging to Caroline P. Trask; the same to be maintained as part of the town road laid out by the selectmen of the town of Edgecomb, May fourth, nineteen hundred and three, and accepted by said town May thirteenth, nineteen hundred and three.

Sheepscot River.

Edgecomb, Me., may bridge cove on east side of.

SEC. 2. That the right to amend or repeal this Act is expressly reserved.

Amendment.

Approved, March 16, 1908.

CHAP. 91.—An Act To authorize T. H. Friel or assigns to construct a dam across Mulberry Fork of the Black Warrior River.

March 16, 1908.
[H. R. 16716.]

[Public, No. 59.]
Vol. 35, p. 45.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That T. H. Friel or assigns be, and they are hereby, authorized to construct, maintain, and operate a dam across the Mulberry Fork of the Black Warrior River, at a point within ten miles north and within two miles south of its junction with the Sipsey Fork, in Walker County, in the State of Alabama, in accordance with the provisions of the Act entitled "An Act to regulate the construction of dams across navigable waters," approved June twenty-first, nineteen hundred and six.

Mulberry Fork of Black Warrior River, Ala.

T. H. Friel may dam.

Location.

Vol. 34, p. 386.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

Approved, March 16, 1908.

March 16, 1908. [H. R. 16749.] [Public, No. 60.] Vol. 35, p. 45.

CHAP. 92.—An Act To amend an Act entitled "An Act to authorize the construction of a bridge across the Monongahela River in the State of Pennsylvania by the Liberty Bridge Company," approved March second, nineteen hundred and seven.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section two of an Act entitled "An Act to authorize the construction of a bridge across the Monongahela River in the State of Pennsylvania by the Liberty Bridge Company," approved March second, nineteen hundred and seven, be, and is hereby, amended to read as follows:

Monongahela River.

Time extended for building Liberty Bridge Company at Pittsburg, Pa.

Vol. 34, p. 1217. Amended.

"SEC. 2. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from March fifteenth, nineteen hundred and eight."

Approved, March 16, 1908.

March 23, 1908. [S. 3.] [Public, No. 61.] Vol. 35, p. 47.

CHAP. 100.—An Act Authorizing and empowering the Secretary of War to locate a right of way for and granting the same and the right of way for the construction of a line of railroad through the Three Tree Point Military Reservation, in the State of Washington, to the Grays Harbor and Columbia River Railway Company, its successors and assigns.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War may authorize the Grays Harbor and Columbia River Railway Company to build a [illegible] through the Three Tree Point Military Reservation on Columbia River, and to that end may set aside for the company by said Grays Harbor and Columbia River Railway Company such ground, and no more, as is found necessary for the necessary track, embankments, and trestles: *Provided*, That the ground so [illegible] the property of the United States [illegible] military purposes as the military [illegible] necessary to exercise: *Provided*, That said railway company shall com- [illegible] timber that may be cut [illegible] for such [illegible] the Secretary of War: [illegible] grade of said [illegible] within the [illegible] pertaining to [illegible] shall be [illegible] Secretary of War may deem [illegible] of the military [illegible] Government [illegible] Nothing in this Act [illegible] construed as authorizing the use of any portion

of the reservation as a borrow pit for fills and embankments, unless specially authorized so to do by the Secretary of War, and upon the payment of such compensation as may be fixed by him.

Time of construction.

SEC. 2. That this Act shall be null and void if actual construction of the road be not commenced within two years from date of approval hereof.

Amendment.

SEC. 3. That Congress reserves the right to alter, amend, or repeal this Act.

Approved, March 26, 1908.

March 26, 1908. [H.R. 17311.] [Public No. 68. Vol. 35, p. 49.

CHAP. 104.—An Act To authorize the Pensacola, Mobile and New Orleans Railway Company, a corporation existing under the laws of the State of Alabama, to construct a bridge over and across the Mobile River and its navigable channels on a line approximately east of the north boundary line of the city of Mobile, Alabama.

Mobile River, Ala.

Pensacola, Mobile and New Orleans Railway Company may bridge at Mobile.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Pensacola, Mobile and New Orleans Railway Company, a corporation existing under the laws of the State of Alabama, be, and is hereby, authorized to construct, operate, and maintain a bridge, and its approaches thereto, across the Mobile River and its navigable channels, in the counties of Baldwin and Mobile, in the State of Alabama, at a point approximately east of the north boundary line of the city of Mobile, to be approved by the Secretary of War, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, and repeal this Act is hereby expressly reserved.

Approved, March 26, 1908.

March 26, 1908. [S. R. 58.] [Pub. Res., No. 14.] Vol. 35, p. 569.

[No. 14.] Joint Resolution Authorizing the Secretary of War to establish harbor lines in Wilmington Harbor, California.

San Pedro, Cal.

Establishing harbor lines, Wilmington Harbor, authorized.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War is hereby authorized to fix and establish pierhead and bulkhead lines, either or both, in the inner harbor of San Pedro, otherwise known as Wilmington Harbor, California, beyond which no piers, wharves, bulkheads, or other works shall be extended or deposits made except under such regulations as shall be prescribed from time to time by the Secretary of War.

Regulations.

Approved, March 26, 1908.

March 28, 1908. [H. J. Res. 101.]

[No. 15.] Joint Resolution Authorizing the Secretary of War to secure a suitable design for a statue of the late Commodore John D. Sloat at Monterey, California.

[Pub. Res., No. 15.] Vol. 35, p. 570.

John D. Sloat. Design for statue to, at Monterey, Cal., authorized.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he is hereby, authorized and directed to use, for the purpose of securing a suitable design for a statue of the late Commodore John D. Sloat, so much as may be necessary of the amount appropriated by the Act of March fourth, nineteen hundred and seven, entitled "An Act to aid in the completion of a monument at Monterey, California, to commemorate the taking possession of the Pacific coast by Commodore John D. Sloat, United States Navy": *Provided*, That the total amount used for securing said design shall not exceed one thousand dollars.

Vol. 34, p. 1408.

Proviso. Minimum cost.

Approved, March 28, 1908.

April 1, 1908. [H. R. 17510.]

CHAP. 118.—An Act To authorize the county of Ashley, in the State of Arkansas, to construct a bridge across Bayou Bartholomew, Ashley County, Arkansas, at Portland.

[Public, No. 79.] Vol. 35, p. 54.

Bayou Bartholomew. Ashley County, Ark., may bridge, at Portland.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Ashley, a corporation organized under the laws of the State of Arkansas, its successors and assigns, be, and is hereby, authorized to construct, maintain, and operate a steel drawbridge and approaches thereto, across the Bayou Bartholomew, at Portland, in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, April 1, 1908.

April 1, 1908. [H. R. 17511.]

CHAP. 119.—An Act To authorize the construction of a bridge across Bayou Bartholomew at Parkdale, Ashley County, Arkansas.

[Public, No. 80.] Vol. 35, p. 54.

Bayou Bartholomew. Ashley County, Ark., may bridge, at Parkdale.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Ashley, a corporation organized under the laws of the State of Arkansas, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a steel drawbridge and approaches thereto across the Bayou Bartholomew at Parkdale, in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or, repeal this Act is hereby expressly reserved. Amendment.

Approved, April 1, 1908.

CHAP. 120.—An Act To authorize the county of Ashley in the State of Arkansas to construct a bridge across Bayou Bartholomew, Ashley County, Arkansas, at Wilmot.

April 1, 1908. [H. R. 17512.] [Public, No. 81.] Vol. 35, p. 54.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the county of Ashley, a corporation organized under the laws of the State of Arkansas, its successors and assigns, be, and is hereby, authorized to construct, maintain, and operate a steel drawbridge and approaches thereto across the Bayou Bartholomew at Wilmot, in the State of Arkansas, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Bayou Bartholomew. Ashley County, Ark., may bridge, at Wilmot.

Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved. Amendment.

Approved, April 1, 1908.

CHAP. 130.—An Act To authorize the counties of Allegheny and Washington, in the State of Pennsylvania, to change the site of the joint county bridge which now crosses the Monongahela River at Monongahela City, Pennsylvania, and to construct a new bridge across said river in the place of said present bridge upon a new site.

April 3, 1908. [H. R. 13448.] [Public, No. 86.] Vol. 35, p. 56.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the counties of Allegheny and Washington, in the State of Pennsylvania, be, and they are hereby, authorized to construct, maintain, and operate a joint county bridge and approaches thereto across the Monongahela River at Monongahela City, in the State aforesaid, upon a site located at a distance of about one thousand feet down the stream of said river from the existing bridge across the same, which connects Monongahela City, in Washington County, with Forward Township, in Allegheny County, and is now maintained by the said two counties jointly for the uses and purposes of general public travel. The said bridge hereby authorized shall be constructed in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six, and upon its construction shall take the place of and be substituted for the aforesaid existing bridge, which shall thereupon be torn down and removed: *Provided*, That the new bridge here-

Monongahela River. Allegheny and Washington counties, Pa., may bridge.

Location.

Vol. 34, p. 84.

Removal of old bridge.

Provisos.

Time of completion of new bridge and removal of old one.

by authorized shall be completed within eighteen months from date of approval of this Act, and the existing bridge shall be completely removed within six months thereafter: *Provided further*, That this Act shall not be construed as nullifying the orders of the Secretary of War, issued under date of October tenth, nineteen hundred and six, to the commissioners of the counties of Allegheny and Washington, Pennsylvania, and the Williamsport Bridge Company, requiring the alteration of the existing bridge, but the said orders shall remain in full force and effect, and unless the new bridge is built and the present bridge is removed within the time specified in this Act, the aforesaid parties shall be liable to the penalties prescribed in section eighteen of the river and harbor Act of March third, eighteen hundred and ninety-nine, for failure to comply with the lawful orders of the Secretary of War.

Restrictions.

Penalties. Vol. 30, p. 1153.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, April 3, 1908.

April 3, 1908. [H. R. 18615.] [Public, No. 88.] Vol. 35, p. 57.

CHAP. 132.—An Act To authorize the Cairo and Norfolk Railroad Company to construct bridges across the Cumberland River.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Cairo and Norfolk Railroad Company, a corporation organized under the laws of the States of Tennessee and Kentucky, its successors and assigns, be, and they are hereby, authorized to construct, operate, and maintain a railroad bridge and approaches thereto across the Cumberland River between Rosita, Tennessee, and the Tennessee Rolling Works, Lyon County, Kentucky, and also to construct a bridge across said Cumberland River between Celina, in Clay County, Tennessee, and Bakertown, Cumberland County, in the State of Kentucky, in accordance with the provisions of the act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Cumberland River.

Cairo and Norfolk Railroad Company may construct two bridges across.

Locations.

Vol. 34, p. 84.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Former act repealed. Vol. 34, p. 1254.

SEC. 3. That the Act of Congress approved March second, nineteen hundred and seven, entitled "An Act to authorize the Cairo and Tennessee River Railroad Company to construct bridges across the Cumberland River," is hereby repealed.

Approved, April 3, 1908.

CHAP. 133.—An Act To authorize the Cairo and Norfolk Railroad Company to construct a bridge across the Tennessee River.

April 3, 1908. [H. R. 18616.] [Public, No. 89.] Vol. 35, p. 58.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Cairo and Norfolk Railroad Company, a corporation organized under the laws of the States of Tennessee and Kentucky, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a railroad bridge and approaches thereto across the Tennessee River between Hamlin, Calloway County, Kentucky, and Birmingham, Marshall County, in the State of Kentucky, in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Tennessee River. Cairo and Norfolk Railway Company may bridge. Location. Vol. 34, p. 84.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Amendment.

SEC. 3. That the Act of Congress approved March second, nineteen hundred and seven, entitled "An Act to authorize the Cairo and Tennessee River Railroad Company to construct a bridge across the Tennessee River," is hereby repealed.

Former act repealed. Vol. 34, p. 1253.

Approved, April 3, 1908.

CHAP. 151.—An Act To provide for safety of life on navigable waters during regattas or marine parades.

April 28, 1908. [S. 6028.] [Public, No. 102.] Vol. 35, p. 69.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of Commerce and Labor is hereby authorized and empowered in his discretion to issue from time to time regulations, not contrary to law, to promote the safety of life on navigable waters during regattas or marine parades.

Marine parades, etc. Protection to life on navigable waters during.

SEC. 2. That to enforce such regulations the Secretary of Commerce and Labor may detail any public vessel in the service of that Department and make use of any private vessel tendered gratuitously for the purpose, or upon the request of the Secretary of Commerce and Labor the head of any other Department may enforce the regulations issued under this Act by means of any public vessel of such Department and of any private vessel tendered gratuitously for the purpose.

Enforcement of regulations. Secretary of Commerce and Labor may detail public vessels, etc.

SEC. 3. That the authority and power bestowed upon the Secretary of Commerce and Labor by sections one and two may be transferred for any special occasion to the head of another Department by the President whenever in his judgment such transfer is desirable.

Transfer of authority allowed.

SEC. 4. That for any violation of regulations issued pursuant to this Act the following penalties shall be incurred:

Penalties for violation.

By licensed officers.

(a) A licensed officer shall be liable to suspension or revocation of license in the manner now prescribed by law for incompetency or misconduct.

Nonlicensed persons.

(b) Any person in charge of the navigation of a vessel other than a licensed officer shall be liable to a penalty of five hundred dollars.

Owner, if actually on board.

(c) The owner of a vessel (including any corporate officer of a corporation owning the vessel) actually on board shall be liable to a penalty of five hundred dollars, unless the violation of regulations shall have occurred without his knowledge.

Other persons.

(d) Any other person shall be liable to a penalty of two hundred and fifty dollars.

Remission of penalties.

The Secretary of Commerce and Labor is hereby authorized and empowered to mitigate or remit any penalty herein provided for in the manner prescribed by law for the mitigation or remission of penalties for violation of the navigation laws.

Repeal. Vol. 29, p. 122.

SEC. 5. That the Act approved May nineteenth, eighteen hundred and ninety-six, entitled "An Act to provide for the safety of passengers on excursion steamers," is hereby repealed.

Effect.

SEC. 6. That this Act shall take effect on April tenth, nineteen hundred and eight.

Approved, April 28, 1908.

April 30, 1908. [H. R. 15219.] [Public, No. 104.] Vol. 35, pp. 70, 84.

CHAP. 153.—An Act Making appropriations for the current and contingent expenses of the Indian Department, for fulfilling treaty stipulations with various Indian tribes, and for other purposes, for the fiscal year ending June thirtieth, nineteen hundred and nine.

Indian Department appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, for the purpose of paying the current and contingent expenses of the Indian Department, for fulfilling treaty stipulations with various Indian tribes, and in full compensation for all offices the salaries for which are specially provided for herein for the service of the fiscal year ending June thirtieth, nineteen hundred and nine, namely:

* * * * *

Nebraska.

NEBRASKA.

* * * * *

Winnebagoes.

WINNEBAGOES. (TREATY.)

* * * * *

Niobrara River. Repairing old bridge.

For the purpose of rewooding and repiling the present old bridge across the Niobrara River between the Santee and Ponca reservations, Nebraska, supplying the same

with new ice breaks, but using the ironwork of the old combination bridge, the sum of twelve thousand dollars, or so much thereof as may be necessary, the work to be done under the direction and supervision of the War Department;

* * * * *

Approved, April 30, 1908.

CHAP. 157.—An Act To grant to the city of Seattle, in the State of Washington, certain rights of way for sewer and street purposes through and along the military reservation of Fort Lawton, Washington, and through the reservations for the Lake Washington Canal.

May 2, 1908. [S. 5126.]

[Public, No. 107.]

Vol. 35, p. 99.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the city of Seattle, a municipal corporation of the State of Washington, is hereby granted the right to construct and maintain a tunnel for sewer and drainage purposes under and across the military reservation of Fort Lawton, Washington, from a point on the east boundary of said reservation so selected that the central line of said tunnel shall bear north eighty-two degrees west, approximately, to the intersection of L street and Delaware avenue (formerly McGraw street) of the Seattle tide lands; thence northwesterly into Puget Sound: *Provided*, That all work on the reservation shall be subject to the approval of the Secretary of War and to such regulations as he may prescribe in the interest of good order and to prevent any unnecessary injury to the reservation or to public property thereon: *Provided further*, That if, at any time, the discharge of said sewer shall become injurious to the sanitary conditions of Fort Lawton, the city of Seattle, upon notification by the Secretary of War, shall take prompt measures to abate the objectionable features: *And provided further*, That if the construction of the Lake Washington Canal shall have been decided upon before the completion of said sewer, the city of Seattle, with the approval of the Secretary of War, may so modify the location of the outfall and the route across the reservation as best to meet the new conditions created by the canal.

Seattle, Wash. Granted right of way through Fort Lawton Military Reservation, for drainage purposes. Description.

Provisos. Secretary of War to approve work, etc.

Changes.

Location.

SEC. 2. That the city of Seattle is also granted a right of way one hundred and fifty feet wide, for street and tunnel purposes, across the reservations for the old and new locations of the Lake Washington Canal—the central line of said right of way bearing approximately north from a point on the south line of the old location reserve, situated about six hundred and thirty-nine feet westerly from the southerly monument in Twenty-fourth avenue north (formerly East street); together with the use for similar purposes of land included by the south boundary of the old location reserve, the east boundary of said

Lake Washington Canal reservation. Right of way through, granted. Description.

right of way, a line bearing approximately north from said southerly monument, about seventy feet, to the northerly monument in Twenty-fourth street, a line bearing westerly from said northerly monument, parallel to and seventy feet distant from the southerly line of the old location reserve, about four hundred and sixty feet in length, and a line from the westerly end of the last-mentioned line, bearing north about forty-four degrees and fourteen minutes west, about one hundred and fifty feet, to the east boundary of said right of way: *Provided*, That any structures placed by said city in said right of way shall be subject to the supervision of the Secretary of War and to such changes as he may from time to time prescribe in order that the use of said rights of way shall not obstruct any improvements which the United States may make on said reservations.

Proviso. Changes, etc.

Tunnel for sewer, gas, etc.

SEC. 3. That the city of Seattle is also granted the right to construct and maintain a tunnel to carry water, sewer, gas, and other pipes, and electric wires, under and across the Lake Washington Canal Reservation near Third avenue, west, in the city of Seattle, subject to such conditions as to location and plans of the tunnel and to such changes in respect thereto as the Secretary of War may from time to time prescribe in order that the tunnel shall not obstruct any improvement which the United States may make on said reservation.

Fort Lawton. Street along boundaries.

SEC. 4. That the city of Seattle is further granted the right to open and perpetually maintain a public street in and along the southern, eastern, and northern boundaries of the military reservation of Fort Lawton, Washington, using for that purpose a strip of land thirty feet wide within the reservation and along said boundaries, beginning at the meander corner between sections fifteen and sixteen, township twenty-five north, range three east, Willamette meridian; thence along the reservation boundary northerly, easterly, northerly, westerly, northerly, westerly, northerly, westerly, and northerly to the meander line on the north side of section ten of said township and range: *Provided*, That all expense of opening and maintaining said street shall be borne by said city and that the work of moving the Government fences to the location made necessary by this grant shall be done by said city without expense to the United States and to the satisfaction of the military authorities.

Proviso. Expense, etc.

Approved, May 2, 1908.

May 11, 1908. [H. R. 17288.] [Public, No. 112.] Vol. 35, p. 106.

CHAP. 163.—An Act Making appropriation for the support of the Army for the fiscal year ending June thirtieth, nineteen hundred and nine.

Army appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and they are hereby,

appropriated, out of any money in the Treasury not otherwise appropriated, for the support of the Army for the year ending June thirtieth, nineteen hundred and nine:

* * * * *

PAY TO CLERKS, MESSENGERS, AND LABORERS AT HEADQUARTERS OF DIVISIONS, AND DEPARTMENTS AND OFFICE OF THE CHIEF OF STAFF.

Clerks, etc.

* * * * *

* * * *Provided*, That no clerk, messenger, or laborer at headquarters of divisions, departments, or office of the Chief of Staff, shall be assigned to duty with any bureau in the War Department.

Proviso. Assignment to duty in War Department forbidden.

* * * * *

MISCELLANEOUS.

Miscellaneous.

* * * * *

For mileage to officers and contract surgeons when authorized by law, six hundred thousand dollars: *Provided*, That hereafter actual expenses only, not to exceed four dollars and fifty cents per day and cost of transportation when not furnished by the Quartermaster's Department, shall be paid to the officers of the Army, contract surgeons, and dental surgeons, when traveling on duty without troops, under competent orders, within the geographical limits of the Territory of Alaska.

Mileage to officers, etc. *Proviso.* Per diem, etc., Alaska.

* * * * *

QUARTERMASTER'S DEPARTMENT.

Quartermaster's Department.

* * * * *

For the purchase of the necessary instruments, office furniture, stationery, and other authorized articles required for the equipment and use of the officers' schools at the several military posts, twelve thousand dollars.

Equipment of post schools.

* * * * *

ENGINEER DEPARTMENT.

Engineer Department.

ENGINEER DEPOTS: For incidental expenses of the depots, including fuel, lights, chemicals, stationery, hardware, machinery, pay of civilian clerks, mechanics, and laborers, extra-duty pay to soldiers necessarily employed for periods not less than ten days as artificers on work in addition to and not strictly in the line of their military duties, such as carpenters, blacksmiths, draftsmen, printers, lithographers, photographers, engine drivers, telegraph operators, teamsters, wheelwrights, masons, machinists, painters, overseers, laborers; repairs of, and for materials to repair, public buildings, machinery, and unforeseen expenses, eleven thousand five hundred dollars.

Incidental expenses.

For purchase and repair of instruments to be issued to officers of the Corps of Engineers and to officers detailed and on duty as acting engineer officers for use on public works and surveys, five thousand dollars.

Purchase, etc., of instruments.

Engineer School. Washington Barracks, D. C. Equipment.

ENGINEER SCHOOL, WASHINGTON, DISTRICT OF COLUMBIA: Equipment and maintenance of the Engineer School of Application at Washington Barracks, District of Columbia, including purchase of instruments, machinery, implements, models, and materials, for the use of the school and for instruction of engineer troops in their special duties as sappers and miners; for land mining, pontoniering, and signaling; for purchase and binding of professional works of recent date treating of military and civil engineering and kindred scientific subjects, for the library of the United States Engineer School; for incidental expenses of the school, including fuel, lights, chemicals, stationery, hardware, machinery, and boats; for pay of civilian clerks, draftsmen, electricians, mechanics, and laborers; for extra-duty pay to soldiers necessarily employed for periods not less than ten days as artificers on work in addition to and not strictly in the line of their military duties, such as carpenters, blacksmiths, draftsmen, printers, lithographers, photographers, engine drivers, telegraph operators, teamsters, wheelwrights, masons, machinists, painters, overseers, laborers; for repairs of, and materials to repair, public buildings, and machinery; for unforeseen expenses, for travel expenses of officers on journeys approved by the Chief of Engineers and made for the purpose of instruction: *Provided*, That the traveling expenses herein provided for shall be in lieu of mileage and other allowances; and to provide means for the theoretical and practical instruction at the Engineer School by the purchase of text-books, books of reference, scientific and professional papers, and for other absolutely necessary expenses: *Provided further*, That no part of this appropriation shall be used to pay double salaries to any employee of the Engineer School, twenty-five thousand dollars.

Incidental expenses.

Traveling expenses.

Provisos. In lieu of mileage, etc.

Double salaries prohibited.

Pontoon material, tools, etc.

ENGINEER EQUIPMENT OF TROOPS: For pontoon material, tools, instruments, and supplies required for use in the engineer equipment of troops, including the purchase and preparation of engineer manuals, seventy-two thousand five hundred dollars.

Surveyors, etc.

For services of surveyors, survey parties, draftsmen, photographers, master laborers, and clerks to engineer officers on the staff of division, corps, and department commanders, twenty-five thousand dollars.

* * * * *

Approved, May 11, 1908.

May 13, 1908. [S. R. 79.]

[No. 23.] Joint Resolution Authorizing the widening of the channel of Michigan City Harbor.

[Pub. Res., No. 23.] Vol. 35, p. 575.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he is hereby, author-

ized, in his discretion, to use any unexpended balance of money heretofore appropriated or that may be hereafter appropriated for the improvement or maintenance of the harbor at Michigan City, Indiana, for the rebuilding of the western revetment of said harbor upon a new alignment, with the view of widening the channel of said harbor.

Michigan City Harbor, Ind.
Widening channel.
Use of unexpended balances authorized.

Approved, May 13, 1908.

CHAP. 168.—An Act To authorize additional aids to navigation in the Light-House Establishment, and for other purposes.

May 14, 1908.
[H. R. 20784.]
[Public, No. 116.]
Vol. 35, p. 160.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of Commerce and Labor be, and he is hereby, authorized to establish and provide the following additional aids to navigation in the Light-House Establishment under the Light-House Board in the Department of Commerce and Labor, in accordance with the respective limits of cost hereinafter respectively set forth, which shall in no case be exceeded:

Light-houses, beacons, and fog signals.
Additional, established.

* * * * *

SEC. 4. That it is hereby made the duty of the Light-House Board to care for and maintain the anchorage buoys in New York Harbor and Philadelphia Harbor heretofore placed there by the United States.

New York and Philadelphia harbors.
Anchorage buoys.

* * * * *

SEC. 6. That it shall be unlawful for any person to obstruct or interfere with any aid to navigation established or maintained in the Light-House Establishment under the Light-House Board, or to anchor any vessel in any of the navigable waters of the United States so as to obstruct or interfere with range lights maintained therein, and any person violating the provisions of this section shall be deemed guilty of a misdemeanor and be subject to a fine not exceeding the sum of five hundred dollars for each offense, and each day during which such violation shall continue shall be considered as a new offense.

Obstruction to navigation forbidden.
Penalty.

* * * * *

Approved, May 14, 1908.

CHAP. 180.—An Act Authorizing the construction of bridges across navigable waters, and to extend the time for the construction of bridges across navigable waters, and to legalize the contruction of bridges across navigable waters.

May 20, 1908.
[S. 4809.]
[Public, No. 124.]
Vol. 35, p. 166.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the consent of Congress is hereby given to the Vesper-Country Club, a corporation organized under the laws of the State of Massachusetts, for the construction of a bridge across the Merrimac River at Tyngs Island, Massachusetts.

Bridges.
Merrimac River.
Vesper-Country Club may bridge, at Tyngs Island, Mass.

Okanogan River, Wash.
County of Okanogan, etc., may bridge.

That the county of Okanogan and the town of Okanogan, jointly or severally, corporations organized under the laws of the State of Washington, their successors and assigns, be, and they are hereby, authorized, jointly or severally, to construct, maintain, and operate a wagon bridge and approaches thereto across the Okanogan River from some convenient and practical point on the West bank of said river within the limits of said town of Okanogan to some convenient point on the east bank of said river in the south half of the Colville Indian Reservation in the State of Washington.

Location.

Choctawhatchee River.
Geneva County may bridge, near Geneva, Ala.

That the court of county commissioners of Geneva County, Alabama, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Choctawhatchee River, at a point to be approved by the Chief of Engineers and the Secretary of War, about six miles above the town of Geneva, Alabama.

Colorado River.
Arizona and California Railway Company may bridge, at Parker, Ariz.
Vol. 35, p. 5.
Ante, p. 2568.

That the Arizona and California Railway Company, a corporation organized under the laws of the Territory of Arizona, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge, and approaches thereto, across the Colorado River, at or near Parker, in the Territory of Arizona, as may be approved by the Secretary of War, for the passage of railroad trains by means of a single or double track, and also at the option of said company, its successors and assigns, to be used for the passage of wagons, vehicles, street cars, animals, and persons on foot and in vehicles.

Missouri River.
Missouri Central Railroad Company may bridge, at Glasgow, Mo.

That the Missouri Central Railroad Company, a corporation organized under the laws of the State of Missouri, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Missouri River at a point just south of the city of Glasgow, being about five hundred yards south of the bridge now owned by the Chicago and Alton Railroad Company, to an opposite point in Saline County, in the State of Missouri.

Missouri River.
Missouri Central Railroad Company may bridge, at St. Charles, Mo.

That the Missouri Central Railroad Company, a corporation organized under the laws of the State of Missouri, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Missouri River at a point near the city of Saint Charles, being about three and one-half miles south of west of said city of Saint Charles, to a point due south in Saint Louis County, all in the State of Missouri.

Mississippi River, Minn.
Mississippi, Hill City and Western Railway Company may bridge.

That the Mississippi, Hill City and Western Railway Company, a corporation organized under the laws of the State of South Dakota, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a railroad bridge and approaches thereto across

the Mississippi River at section four, township fifty-two north, range twenty-three west, being in Aitkin County, in the State of Minnesota.

Location.

That the Iron Dyke Copper Company, a corporation organized under the laws of the State of Pennsylvania, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a toll bridge and approaches thereto across the Snake River at a point to be selected between Homestead and Ballards Landing, on said river, between the States of Oregon and Idaho.

Snake River. Iron Dyke Copper Company may bridge, at Homestead, Oreg.

That section seven of the act approved March twenty-sixth, nineteen hundred and two, as amended by an Act approved June thirtieth, nineteen hundred and six, authorizing the South Omaha Railroad and Bridge Company to build a bridge and approaches thereto across Missouri River at or near the city of South Omaha, Douglas County, is hereby amended by extending the time for the construction of said bridge and approaches thereto to April fifteenth, nineteen hundred and ten.

Missouri River. Time extended for bridging, by South Omaha Railroad and Bridge Company, at South Omaha, Nebr. Vol. 32, p. 52. Vol. 34, p. 817, amended.

That the Copper River Railway Company, a corporation organized and existing under the laws of the State of Washington, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate two bridges across the Copper River, in the Territory of Alaska, below the Abercrombie Canyon, to be located as follows: The first, or lower bridge, to cross the said Copper River at a point below Childs Glacier; and the second, or upper bridge, to cross said Copper River at some point between Childs Glacier and Miles Glacier, and slightly upstream from the location that has been selected as a bridge crossing by the Alaska Pacific Railway and Terminal Company, and a sufficient distance therefrom to avoid interference with the construction or operation of the bridge across said river that may lawfully be erected by said last-named company.

Copper River, Alaska. Copper River Railway Company may bridge. Two bridges; locations.

That the Copper River and Northwestern Railway Company, a corporation organized and existing under the laws of the State of Nevada, be, and is hereby, authorized to construct, operate, and maintain a bridge and its approaches thereto across Bering Lake, in the Territory of Alaska.

Bering Lake, Alaska. Copper River and Northwestern Railway Company may bridge.

That section six of an Act authorizing the Winnepeg, Yankton and Gulf Railroad Company to construct a combined railroad, wagon, and foot-passenger bridge across the Missouri River at or near the city of Yankton, South Dakota, approved April fifth, nineteen hundred and four, as amended by the Act approved February nineteenth, nineteen hundred and seven, be, and the same is hereby, so amended that the time within which the said bridge is required to be commenced shall be within one year and the time within which it is required that the said bridge shall be completed shall be within three years from the date of the approval of this Act.

Missouri River. Time extended for bridging, by Winnepeg, Yankton and Gulf Railroad Company, at Yankton, S. Dak. Vol. 33, p. 157. Vol. 34, p. 897, amended.

Rock River, Ill.
Rock River Traction Company may bridge.
Location.

That the Rock River Traction Company, a corporation organized under the laws of the State of Illinois, its successors and assigns, be, and they are hereby, authorized to construct a bridge across Rock River at a point between the first section line south of the Colona Ferry (the section line between sections nine and ten, township seventeen north, range one east) and the first section line east of the Cleveland Ferry (the section line between sections twenty-nine and thirty, township eighteen north, range two east), said bridge to be built across Rock River between the counties of Henry and Rock Island, in the State of Illinois.

Rainy River, Minn.
Time extended for bridging, by International Bridge and Terminal Company.

That the Act of Congress entitled "An Act to provide for the construction of a bridge across Rainy River, in the State of Minnesota," approved February seventh, nineteen hundred and three, is hereby revived and reenacted.

That section six of the aforesaid Act is hereby amended to read as follows:

Time of construction.
Vol. 32, p. 802, amended.
Construction within Canadian jurisdiction.

"SEC. 6. That this Act shall be null and void if actual construction of the bridge herein authorized be not commenced within one year and completed within three years from July first, nineteen hundred and eight; and that the construction shall not be commenced until the Government of the Dominion of Canada has authorized the construction and maintenance of that part of said bridge which shall occupy that portion of the river which is under the jurisdiction of said Dominion government."

Red Lake River.
Highlanding, Minn., may bridge.
Location.

That the board of supervisors of the town of Highlanding, Red Lake County, Minnesota, be, and they are hereby, authorized to construct, maintain, and operate a highway bridge and approaches thereto across the Red Lake River on the section line between sections twenty-nine and thirty, township one hundred and fifty-three north, range forty west, in the State of Minnesota.

Mississippi River.
Bemidji, Minn., may bridge.
Location.

That the city of Bemidji, a corporation organized under the laws of the State of Minnesota, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a highway bridge and approaches thereto across the Mississippi River, at section sixteen, township one hundred and forty-six, range thirty-three, in the State of Minnesota.

Bayou D'Arbonne, La.
Ruston, Natchitoches and Northeastern Railroad Company may bridge.
Location.

That the Ruston, Natchitoches and Northeastern Railroad Company, a corporation organized under the laws of the State of Louisiana, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a drawbridge and approaches thereto across Bayou D'Arbonne in the State of Louisiana at a suitable point on said stream on the line of its road between the cities of Farmerville, in Union Parish, and Ruston, in Lincoln Parish, in the State of Louisiana.

Mississippi River.
Bridge between Clough and Fort Ripley, Minn., legalized.

That the bridge constructed across the Mississippi River between the townships of Clough, in Morrison County, and Fort Ripley, in Crow Wing County, State of Minnesota, by the authorities of said counties of Morrison and

Crow Wing, be, and the same is hereby, legalized, and the consent of Congress is hereby given to its maintenance by said authorities: *Provided*, That any changes in the said structure which the Secretary of War may at any time deem necessary and order in the interest of navigation shall be promptly made by the owners thereof at their own expense.

Proviso. Changes.

That the township of Manistee, in the county of Manistee, State of Michigan, a municipal corporation organized under the laws of the State of Michigan, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a highway bridge, and approaches thereto, across the south branch or channel of the Manistee River in said township, in the State of Michigan.

Manistee River. Manistee, Mich., may bridge.

That the Aransas Harbor Terminal Railway Company, a corporation organized under Texas law, be, and they are hereby, authorized to construct, maintain, and operate a railroad bridge and approaches thereto across the Morris and Cummings channel at a point near Aransas Pass, Texas, from the mainland to Harbor Island.

Morris and Cummings channel. Aransas Harbor Terminal Company may bridge, at Aransas Pass, Tex.

That the Saint Louis, Brownsville and Mexico Railway Company [a], a corporation organized under the laws of the State of Texas, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a railway, wagon, and foot bridge and approaches thereto across the Rio Grande River, at Brownsville, in the State of Texas, connecting the city of Brownsville, Texas, with the city of Matamoros, Mexico: *Provided*, That the construction of the said bridge shall not be commenced until the consent of the proper authorities of the Republic of Mexico for the erection of the structure shall have been obtained.

Rio Grande River. St. Louis, Brownsville and Mexico Railway Company may bridge, at Brownsville, Tex. Vol. 35, p. 576. *Post*, p. 2599.

Proviso. Consent of Mexico required.

That the Yellowstone Valley Steel Bridge Company, a corporation organized under the laws of the State of Montana, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a bridge and approaches thereto across the Missouri River at or within one mile west of the east boundary line of Montana, in the State of Montana.

Missouri River, Mont. Yellowstone Valley Steel Bridge Company may bridge.

Location.

That an Act entitled "An Act to authorize the construction of a bridge across the Missouri River at a point to be selected within five miles north of the Kaw River in Wyandotte County, State of Kansas, and Clay County, State of Missouri, and to make the same a post route," approved December seventeenth, nineteen hundred and two, be, and the same is hereby, revived and declared to be in full force and effect, and that section eight of said Act is hereby amended so as to read as follows: "That this Act shall be null and void if actual construction of

Missouri River, Kans. and Mo. Time extended for bridging, by Kansas City Outer Belt and Electric Railroad Company. Vol. 32, p. 755, amended.

[a] Joint resolution No. 25, approved May 22, 1908, changes this name to that of the Brownsville and Gulf Railway Company.

the bridge herein authorized be not commenced within one year and completed within three years from the first day of May, nineteen hundred and eight."

Muskegon River.

That the county of Muskegon, in the State of Michigan, a corporation organized under the laws of the State of Michigan, its successors and assigns, be, and they are hereby, authorized to construct, maintain, and operate a highway bridge and approaches thereto across the Muskegon River on the line between the counties of Muskegon and Newaygo, in said State of Michigan.

Muskegon County, Mich., may bridge.

Location.

Construction.

SEC. 2. That all of the bridges authorized to be constructed by this Act shall be constructed in accordance with the provisions of the Act entitled "An Act to regulate the construction of bridges over navigable waters," approved March twenty-third, nineteen hundred and six.

Vol. 34, p. 84.

Amendment.

SEC. 3. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

Approved, May 20, 1908.

May 22, 1908. [H. R. 16882.]

[Public, No. 130.]

Vol. 35, pp. 184, 216, 217, 244.

CHAP. 186.—An Act Making appropriations for the legislative, executive, and judicial expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and nine, and for other purposes.

Legislative, executive, and judicial expenses appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, in full compensation for the service of the fiscal year ending June thirtieth, nineteen hundred and nine, for the objects hereinafter expressed, namely:

* * * * *

War Department.

WAR DEPARTMENT.

* * * * *

Engineers' Office.

OFFICE OF THE CHIEF OF ENGINEERS: For chief clerk, two thousand dollars; two chiefs of division, at two thousand dollars each; eight clerks of class four; eleven clerks of class three; twelve clerks of class two; fifteen clerks of class one; nine clerks, at one thousand dollars each; eleven clerks, at nine hundred dollars each; six messengers; three assistant messengers; and two laborers; in all, one hundred thousand two hundred and twenty dollars.

Skilled draftsmen, etc.

And the services of skilled draftsmen, civil engineers, and such other services as the Secretary of War may deem necessary, may be employed only in the office of the Chief of Engineers, to carry into effect the various appropriations for rivers and harbors, fortifications, and surveys, to be paid from such appropriations: *Provided*, That the expenditures on this account for the fiscal year ending June thirtieth, nineteen hundred and nine, shall not exceed fifteen thousand dollars; and that the Secretary of

Proviso. Limit, etc.

War shall each year, in the annual estimates, report to Congress the number of persons so employed, their duties, and the amount paid to each.

* * * * *

PUBLIC BUILDINGS AND GROUNDS.

Public buildings and grounds.

Engineer, clerks, etc.

OFFICE OF PUBLIC BUILDINGS AND GROUNDS: For one assistant engineer, two thousand four hundred dollars; assistant and chief clerk, two thousand four hundred dollars; one clerk of class four; one clerk of class three; clerk and stenographer, one thousand four hundred dollars; one messenger; landscape gardener, two thousand four hundred dollars; surveyor and draftsman, one thousand five hundred dollars; in all, fourteen thousand three hundred and forty dollars.

Foremen, etc.

For foremen, gardeners, mechanics, and laborers employed in the public grounds, thirty-one thousand two hundred dollars.

For one sergeant of park watchmen, nine hundred and fifty dollars.

For second sergeant of park watchmen, nine hundred dollars.

Watchmen.

For day watchmen as follows: One in Franklin Park; one in Lafayette Park; two in Smithsonian grounds; one in Judiciary Park; one in Lincoln Park and adjacent reservations; one at Iowa Circle; one at Thomas Circle and neighboring reservations; one at Washington Circle and neighboring reservations; one at Dupont Circle and neighboring reservations; one at McPherson and Farragut parks; one at Stanton Park and neighboring reservations; two at Henry and Seaton parks; one at Mount Vernon Park and adjacent reservations; one for the greenhouses and nursery; two at grounds south of Executive Mansion; one at Garfield Park; one at Monument Park; and one at Monument Park Annex (Potomac Park); twenty-one in all, at seven hundred and twenty dollars each, fifteen thousand one hundred and twenty dollars.

For night watchmen as follows: Two in Smithsonian grounds; one in Judiciary Park; two in Henry and Seaton parks; one in grounds south of Executive Mansion; one in Monument Park; one at Monument Park Annex (Potomac Park); and two in Garfield Park; ten in all, at seven hundred and twenty dollars each, seven thousand two hundred dollars.

Wakefield, Va.

For watchman for the care of the monument and dock at Wakefield, Virginia, the birthplace of Washington, three hundred dollars.

One day watchman and one night watchman for that part of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the Potomac River, and the tidal reservoir, two in all, at seven hundred and twenty

dollars each, one thousand four hundred and forty dollars.

One night watchman in that part of Potomac Park between the Virginia channel of the Potomac River, the tidal reservoir, and the sewer canal, seven hundred and twenty dollars.

Night watchmen for Stanton and Lincoln parks and ten adjoining reservations, Lafayette, Franklin, McPherson, and Farragut parks, Washington, Dupont, Iowa, and Thomas circles, Mount Vernon Square, and reservations on Massachusetts avenue from Seventh to Seventeenth streets, four in all, at seven hundred and twenty dollars each, two thousand eight hundred and eighty dollars.

Contingent expenses.

For contingent and incidental expenses, including purchase of professional and scientific books and periodicals, books of reference, blank books, photographs, and maps, seven hundred dollars.

For purchase and repair of bicycles and revolvers for park watchmen and for purchase of ammunition, three hundred dollars.

Amount from District revenues.

Of the foregoing amounts appropriated under Public Buildings and Grounds, the sum of thirty thousand two hundred and fifty-five dollars shall be paid out of the revenues of the District of Columbia.

* * * * *

Pay of switchboard operators, assistant messengers, laborers, etc., rated.

SEC. 2. The pay of telephone switchboard operators, assistant messengers, firemen, watchmen, laborers, and charwomen provided for in this Act, except those employed in mints and assay offices, unless otherwise specially stated, shall be as follows: For telephone switchboard operators, assistant messengers, firemen, and watchmen, at the rate of seven hundred and twenty dollars per annum each; for laborers, at the rate of six hundred and sixty dollars per annum each, assistant telephone switchboard operators at the rate of six hundred dollars each, and for charwomen, at the rate of two hundred and forty dollars per annum each.

No pay to permanently incapacitated persons.

SEC. 3. The appropriations herein made for the officers, clerks, and persons employed in the public service shall not be available for the compensation of any persons incapacitated otherwise than temporarily for performing such service, and the heads of Departments shall cause this provision to be enforced.

Travel expenses of Department employees at Washington to be annually reported, etc.

SEC. 4. It shall be the duty of the head of each Executive Department and other Government establishment at Washington to submit to Congress at the beginning of each regular session a statement showing in detail what officers or employees (other than special agents, inspectors, or employees, who in the discharge of their regular duties are required to constantly travel) of such Executive Department or other Government establishment have traveled on official business from Washington to points outside of the District of Columbia during the preceding fiscal year, giving in each case the full title of the official

or employee, the destination or destinations of such travel, the business or work on account of which the same was made, and the total expense to the United States charged in each case.

SEC. 5. That all laws or parts of laws inconsistent with this Act are repealed. Repeal.

Approved, May 22, 1908.

[No. 25.] Joint Resolution To amend an Act authorizing the construction of bridges across navigable waters, and so forth.

May 22, 1908. [S. R. 90.]

[Pub. Res., No. 25.] Vol. 35, p. 576.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the bill (S. 4809) entitled "An Act authorizing the construction of bridges across navigable waters, and to extend the time for the construction of bridges across navigable waters, and to legalize the construction of bridges across navigable waters," be, and the same is hereby, corrected so that the name Saint Louis, Brownsville and Mexico Railway Company, as used therein, be changed to the Brownsville and Gulf Railway Company.

Rio Grande. St. Louis, Brownsville and Mexico Railway Company. Name changed to Brownsville and Gulf Railway Company. Vol. 35, p. 168, amended. *Ante*, p. 2595.

Approved, May 22, 1908.

CHAP. 190.—An Act Authorizing certain extensions to be made of the lines of the Anacostia and Potomac River Railroad Company, the Washington Railway and Electric Company, the City and Suburban Railway of Washington, and the Capital Traction Company, in the District of Columbia, and for other puproses.

May 23, 1908. [S. 902.]

[Public, No. 134.] Vol. 35, p. 246.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Anacostia and Potomac River Railroad Company be, and it is hereby, authorized and directed to construct a double-track connection with its tracks on E street south, thence northwardly along First street east to East Capitol street, there to connect with the tracks of the Washington Railway and Electric Company; also a double-track extension from Delaware avenue and C street northeastwardly along Delaware avenue to the plaza in front of the Union Station, together with a double-track loop located as near as may be to the exterior circumference of said plaza and passing in front of and near to the Union Station; * * *

District of Columbia. Extension of tramway tracks to Union Station, etc. Anacostia and Potomac River Railroad Company. Description of double-track extension of.

* * * * *

SEC. 8. That authority is hereby given the Commissioners of the District of Columbia to use such portions of reservation numbered seventy-seven as may in their judgment be necessary for sidewalks and roadways and for street railway use. * * *

Reservation No. 77. Use of, for roadways, etc.

* * * * *

SEC. 18. That Congress reserves the right to alter, amend, or repeal this Act. Amendment.

Approved, May 23, 1908.

May 23, 1908. [H. R. 15444.] [Public, No. 138.] Vol. 35, p. 273.

CHAP. 194.—An Act Extending the time for the construction of a dam across Rainy River.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Rainy River Improvement Company, a corporation organized under the laws of the State of Minnesota, as the successor to the rights and privileges heretofore granted to the Koochiching Company under the following Acts of Congress, namely: Chapter two hundred and thirty-eight of volume thirty, Statutes at Large, entitled "An Act permitting the building of a dam across Rainy River," approved May fourth, eighteen hundred and ninety-eight; and of chapter seven hundred and ninety-seven of volume thirty-three, Statutes at Large, entitled "An Act relating to a dam across Rainy River," approved February twenty-fifth, nineteen hundred and five, and of the various Acts and provisions therein recited amending said Act approved May fourth, eighteen hundred and ninety-eight, and further subject to the restrictions, conditions, and terms of all of said Acts, is hereby authorized to construct and maintain a dam across Rainy River, Minnesota, at the place designated in said Acts, in accordance with the provisions of the Act entitled "An Act to regulate the construction of dams across navigable waters," approved June twenty-first, nineteen hundred and six, so far as the same shall be applicable thereto: *Provided*, That said dam shall be completed on or before July, nineteen hundred and eleven.

Rainy River. Time extended for damming, by Rainy River Improvement Company.

Vol. 30, p. 398.

Vol. 33, p. 814.

Vol. 34, p. 386.

Time of completion.

Amendment.

SEC. 2. That the right to alter, amend, or repeal this Act is hereby expressly reserved.

J G CANNON
Speaker of the House of Representatives.

CHRLS W. FAIRBANKS
Vice-President of the United States and President of the Senate.

IN THE HOUSE OF REPRESENTATIVES
May 12, 1908.

The President of the United States having returned to the House of Representatives in which it originated the bill (H. R. 15444) "An Act extending the time for the construction of a dam across Rainy River," with his objections thereto the House proceeded in pursuance of the Constitution to reconsider the same; and

Resolved, That the said bill pass, two-thirds of the House of Representatives agreeing to pass the same.

Attest:

A MCDOWELL *Clerk.*

IN THE SENATE OF THE UNITED STATES
May 23, 1908.

The Senate having proceeded, in pursuance of the Constitution, to reconsider the bill entitled "An Act extend-

ing the time for the construction of a dam across Rainy River," returned to the House of Representatives by the President of the United States, with his objections, and sent by the House of Representatives to the Senate, with the message of the President returning the bill:

Resolved, That the bill do pass, two-thirds of the Senate agreeing to pass the same.

Attest: CHARLES G. BENNETT
Secretary.

By H. M. ROSE
Asst. Secy.

CHAP. 198.—An Act Making appropriations to provide for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and nine, and for other purposes.

May 26, 1908.
[H. R. 20063.]
[Public, No. 139.]
Vol. 35, pp. 274, 284, 286, 287, 288.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the half of the following sums named, respectively, is hereby appropriated, out of any money in the Treasury not otherwise appropriated, and the other half out of the revenues of the District of Columbia, in full for the purposes following, being for the expenses of the government of the District of Columbia for the fiscal year ending June thirtieth, nineteen hundred and nine, namely:

District of Columbia appropriations.
Half from District revenues.

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IMPROVEMENTS AND REPAIRS.

Improvements and repairs.

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Highway bridge across Potomac River: For salaries of two draw operators, at one thousand and twenty dollars each; one draw operator, seven hundred and twenty dollars; four watchmen, at six hundred dollars each; for labor, one thousand five hundred dollars; and for lighting, power, and miscellaneous supplies, and expenses of every kind necessarily incident to the operation and maintenance of the bridge and approaches, nine thousand three hundred and forty dollars; in all, sixteen thousand dollars.

Highway bridge.

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STREETS.

Streets.

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For constructing public-convenience station to be located on public reservation numbered eight in the city of Washington, twenty thousand dollars.

Public-convenience station on reservation No. 8.

And the jurisdiction and control of such portion of said public reservation numbered eight as may be required for the location and operation of said station and approaches thereto is hereby transferred from the Chief of Engineers of the United States Army to the Commis-

Transfer of jurisdiction, etc., of.

sioners of the District of Columbia, such transfer to take effect from the date of notice by said Commissioners to the Chief of Engineers of the United States Army of the portion of said reservation selected, * * *

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Electrical department.

ELECTRICAL DEPARTMENT.

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Lighting.
Conduit road.
Extension of lighting system to District line.

LIGHTING: * * * *And provided further*, That the Commissioners of the District of Columbia are hereby authorized, in their discretion, to extend the street-lighting system, by incandescent forty-candlepower lamps, on and along the Conduit road, from its intersection with the Canal road to the District line and to use so much of this appropriation as may be necessary for maintaining the lamps. The location of the necessary posts, poles, wires, fixtures, and so forth, and the use of the road therefor shall be subject to such reasonable regulations as may be prescribed by the officer in charge of the Washington Aqueduct.

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Washington aqueduct.

WASHINGTON AQUEDUCT.

Maintenance.

For operation, including salaries of all necessary employees, maintenance, and repair of the Washington Aqueduct and its accessories, including Conduit road, the Washington City reservoir, and Washington Aqueduct tunnel, and also including the purchase and maintenance of horses, vehicles, and harness, and the care and maintenance of the stable, thirty-three thousand dollars.

Surveys, etc., increasing water supply.

For preliminary investigations and surveys for increasing the water supply, ten thousand dollars.

Dalecarlia reservoir.
Use of balances.
Vol. 34, p. 1135.

That any unexpended balances of the appropriations "For removal by dredging of about one hundred and thirty four thousand cubic yards of sediment from Dalecarlia reservoir, sixteen thousand dollars," and "For riprapping the sides of the Dalecarlia reservoir for a width of about twenty feet, eighteen thousand dollars," provided in the District of Columbia appropriation Act (Washington Aqueduct) for the fiscal year nineteen hundred and eight, shall continue and be available for the fiscal year nineteen hundred and nine for the purposes designated under said appropriation in said Act.

Filtration plant.
Salaries, etc.

For care, including salaries of all necessary employees, maintenance, and operation of the Washington Aqueduct, District of Columbia, filtration plant, and for each and every purpose connected therewith, eighty-two thousand dollars: *Provided*, That of the appropriation for these purposes for the fiscal year nineteen hundred and eight not exceeding six thousand dollars may be used for parking the grounds at the Washington City reservoir, to be

Proviso.
Parking.
Vol. 34, p. 1135.

available until the close of the fiscal year nineteen hundred and nine.

For emergency fund, to be used only in case of a serious break requiring immediate repair in one of the important aqueduct or filtration plant structures, such as a dam, conduit, tunnel, bridge, building, or important piece of machinery; all expenditures from this appropriation to be reported in detail to Congress, five thousand dollars. Emergency fund.

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SEC. 9. All laws and parts of laws to the extent that they are inconsistent with this Act are repealed. Repeal.

Approved, May 26, 1908.

CHAP. 200.—An Act Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and nine, and for other purposes.

May 27, 1908. [H. R. 21260.]

[Public, No. 141.]

Vol. 35, pp. 317, 349, 354, 358, 364, 365, 367, 368, 387.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, for the objects hereinafter expressed, for the fiscal year ending June thirtieth, nineteen hundred and nine, namely: Sundry civil expenses appropriations.

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UNDER THE DEPARTMENT OF THE INTERIOR. Interior Department.

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UNITED STATES GEOLOGICAL SURVEY. Geological Survey.

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For the continuation of the analyzing and testing of the coals, lignites, and other mineral fuel substances belonging to the United States, in order to determine their fuel value, and so forth, under the supervision of the Director of the United States Geological Survey, two hundred and fifty thousand dollars: *Provided*, That in examinations, hereby authorized, of fuel materials for the use of the Government of the United States, or for the purpose of increasing the general efficiency or available supply of the fuel resources in the United States, the Director of the Geological Survey may have the necessary materials collected from any part of the United States where they represent extensive deposits; and it shall be the duty of the Director of the Geological Survey to have examined, without charge, the fuels required for use by the Government of the United States, and to give these examinations preference over other work: *Provided further*, That in publishing the results of these investigations, the materials examined shall not be credited to any private party or corporation, but shall be collected and described as repre- Testing fuels. *Provisos.* Examinations. Publishing results.

senting such extensive deposits: *And provided further*, That all investigations hereunder commenced or undertaken shall be completed and fully reported on prior to the first day of July, nineteen hundred and nine, and all investigations and work now in progress under appropriations heretofore made for the purposes mentioned in this paragraph shall also be completed and finally reported on before the close of the fiscal year nineteen hundred and nine.

Investigations to be completed July 1, 1909.

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War Department.

UNDER THE WAR DEPARTMENT.

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Buildings and grounds, D. C.

BUILDINGS AND GROUNDS IN AND AROUND WASHINGTON.

Improvement and care.

For improvement and care of public grounds, District of Columbia, as follows:

For improvement and maintenance of grounds south of Executive Mansion, four thousand dollars.

For ordinary care of greenhouses and nursery, two thousand dollars.

For ordinary care of Lafayette Park, two thousand dollars.

For ordinary care of Franklin Park, one thousand five hundred dollars.

For improvement and ordinary care of Lincoln Park, two thousand dollars.

Monument grounds.

For care and improvement of Monument grounds and annex (Potomac Park) to Monument grounds, seven thousand dollars.

Licenses for boathouses, tidal reservoir banks.

Licenses may be granted for the erection of boat-houses along the banks of the tidal reservoir on the Potomac River fronting Potomac Park, under regulations to be prescribed by the Chief of Engineers, and that all such licenses granted under this authority shall be revocable, without compensation, by the Secretary of War.

For improvement, care, and maintenance of Garfield Park, two thousand five hundred dollars.

For construction and repair of post-and-chain fences, repair of high iron fences, constructing stone coping about reservations, painting watchmen's lodges, iron fences, vases, lamps, and lamp-posts; repairing and extending water pipes, and apparatus for cleaning them; hose; manure, and hauling the same; removing snow and ice; purchase and repair of seats and tools; trees and plant stakes, labels, lime, whitewashing, and stock for nursery, flower pots, twine, baskets, wire, splints, moss, and lycopodium, to be purchased by contract or otherwise, as the Secretary of War may determine; care, construction, and repair of fountains; abating nuisances, cleaning statues, and repairing pedestals, eighteen thousand five hundred and fifty dollars.

For improvement, care, and maintenance of various reservations, including purchase, maintenance, and driv-

ing of horse and vehicle for official use of the officer in charge of public buildings and grounds, and of other necessary vehicles, for official use, twenty-five thousand dollars.

Temporary structures in playgrounds.

The officer in charge of public buildings and grounds is authorized to grant licenses, revocable by him, without compensation, to erect temporary structures upon reservations used as children's playgrounds, under such regulations as he may impose.

For improvement, care, and maintenance of Smithsonian grounds, three thousand dollars.

For improvement and maintenance of Judiciary Park, two thousand five hundred dollars.

For laying cement and other walks in various reservations, two thousand dollars.

For broken-stone road covering for parks, three thousand five hundred dollars.

For curbing, coping, and flagging for park roads and walks, two thousand dollars.

Potomac Park.

For care and maintenance of that part of Potomac Park between the causeway of the Pennsylvania Railroad bridge, the Potomac River, and the tidal reservoir, four thousand dollars.

For care and maintenance of that part of the Potomac Park along the north and west sides of the tidal reservoir, four thousand dollars.

Macadam roadway. Vol. 34, p. 1341.

Any unexpended balance of the appropriation of eighty thousand dollars made by sundry civil act approved March fourth, nineteen hundred and seven, for constructing a macadam roadway along the west side of section two of Potomac Park and for improving the grounds on either side of same, is hereby reappropriated and made available for the same purposes and for general improvement for the fiscal year ending June thirtieth, nineteen hundred and nine.

For care and maintenance of that part of Potomac Park extending along the river side between the inlet to the tidal reservoir and the foot of Twenty-sixth street west, three thousand dollars.

Acquisition of squares 63 and 89.

For continuing the improvement of Potomac Park: To continue north B street from Virginia avenue westward to the Potomac River as a park roadway along the northern boundary of Potomac Park, according to plans prepared in the office of public buildings and grounds, including the acquisition by purchase or condemnation of squares sixty-three and eighty-nine in the city of Washington, to be expended under the direction of the officer in charge of that office, seventy thousand dollars.

Jurisdiction over portion of B street transferred to Chief of Engineers.

The jurisdiction over that portion of B street west of Virginia avenue, now under the control of the Commissioners of the District of Columbia, is hereby transferred to the Chief of Engineers, United States Army.

Roadway over inlet gate.

For the additional expense of widening the foundations and superstructure of the tidal gates over the inlet to the

tidal reservoir in Potomac Park, to permit the construction of a roadway over it, to be expended under the direction of the Chief of Engineers, United States Army, twenty-five thousand dollars.

For reconstruction of the approaches and walks in Judiciary Park abutting the court-house building, three thousand five hundred dollars.

Half from District revenues.

One half of the foregoing sums under "Buildings and grounds in and around Washington" shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Limit for concrete, etc., pavements.

Under appropriations herein contained no contract shall be made for making or repairing concrete or asphalt pavements in Washington City at a higher price than one dollar and eighty-five cents per square yard for a quality equal to the best laid in the District of Columbia prior to July first, eighteen hundred and eighty-six, and with a base of not less than six inches in thickness.

Statue of General Sheridan.

For unveiling the statue of General Philip H. Sheridan and for laying out and improving the grounds around the same, four thousand dollars.

For improvement, care, and maintenance of grounds of Executive Departments, one thousand dollars.

For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Library of Congress as may be requested by the superintendent of the Library building, one thousand dollars.

For such trees, shrubs, plants, fertilizers, and skilled labor for the grounds of the Capitol and office building of the House of Representatives as may be requested by the superintendent of the Capitol building, three thousand dollars.

For improvement and maintenance of Executive Mansion grounds (within iron fence), four thousand dollars.

For the employment of an engineer by the officer in charge of public buildings and grounds, two thousand four hundred dollars.

For purchase and repair of machinery and tools for shops and nursery, and for the repair of shops and storehouse, one thousand dollars.

Executive Mansion.

EXECUTIVE MANSION: For ordinary care, repair, and refurnishing of Executive Mansion, and for purchase, maintenance, and driving of horses and vehicles for official purposes, to be expended by contract or otherwise, as the President may determine, thirty-five thousand dollars.

For fuel for the Executive Mansion greenhouses and stable, six thousand dollars.

For care and maintenance of greenhouses, Executive Mansion, nine thousand dollars.

For repairs to greenhouses, Executive Mansion, three thousand dollars.

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LIGHTING THE EXECUTIVE MANSION AND PUBLIC GROUNDS: For gas, pay of lamplighters, gas fitters, and laborers; purchase, erection, and repair of lamps and lamp-posts; purchase of matches, and repairs of all kinds; stoves, fuel, and lights for office and office stable, watchmen's lodges, and for the greenhouses at the nursery, nineteen thousand five hundred dollars: *Provided*, That for each five-foot burner not connected with a meter in the lamps on the public grounds not more than eighteen dollars shall be paid per lamp for gas, including lighting, cleaning, and keeping the lamps in repair, under any expenditure provided for in this Act; and said lamps shall burn every night, on the average, from fifteen minutes after sunset to forty-five minutes before sunrise; and authority is hereby given to substitute other illuminating material for the same or less price, and to use so much of the sum hereby appropriated as may be necessary for that purpose: *Provided further*, That four thousand two hundred dollars of the foregoing sum shall be paid from the revenues of the District of Columbia and the remainder from the Treasury of the United States: *And provided further*, That not more than six thousand dollars of said appropriation may be expended for lighting, extinguishing, cleaning, repairing, and painting park lamps of a higher candlepower than those provided for above and not less than sixty candlepower, which lamps shall cost not to exceed twenty dollars and eighty-five cents per lamp per annum and shall otherwise be subject to the restrictions of this paragraph.

Lighting Executive Mansion and public grounds.

Provisos. Maximum per lamp.

Part from District revenues.

Higher candlepower.

For lighting six arc electric lights in Executive Mansion grounds within the iron fence, at not exceeding eighty-five dollars per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights, five hundred and ten dollars.

Electric lights.

For lighting six arc electric lights at the propagating gardens, at not exceeding eighty-five dollars per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights, five hundred and ten dollars.

For lighting arc electric lights in public grounds as follows: For seven in grounds south of the Executive Mansion, thirty-two in Lafayette, Franklin, Judiciary, and Lincoln parks, fourteen in grounds south of Executive Mansion and in Monument Park, and twenty-seven in Potomac Park driveway, at not exceeding eighty-five dollars per light per annum, which sum shall cover the entire cost of lighting and maintaining in good order each of said lights; in all, six thousand eight hundred dollars, one half of which sum shall be paid from the revenues of the District of Columbia and the other half from the Treasury of the United States.

Half from District revenues.

TELEGRAPH TO CONNECT THE CAPITOL WITH THE DEPARTMENTS AND GOVERNMENT PRINTING OFFICE: For

Government telegraph.

care and repair of existing lines, one thousand five hundred dollars.

Washington Monument. Maintenance.

WASHINGTON MONUMENT: For the care and maintenance of the Washington Monument, namely: For one custodian, at one hundred dollars per month; one steam engineer, at eighty dollars per month; one assistant steam engineer, at seventy dollars per month; one fireman, at fifty-five dollars per month; one assistant fireman, at fifty-five dollars per month; one conductor of elevator car, at seventy-five dollars per month; one attendant on floor, at sixty dollars per month; one attendant on top floor, at sixty dollars per month; three night and day watchmen, at sixty dollars per month each; in all, eight thousand eight hundred and twenty dollars.

Expenses.

For fuel, lights, oil, waste, packing, tools, matches, paints, brushes, brooms, lanterns, rope, nails, screws, lead, electric lights, heating apparatus, oil stoves for elevator car and upper and lower floors; repairs to engines, boilers, dynamos, elevator, and repairs of all kinds connected with the Monument and machinery; and purchase of all necessary articles for keeping the Monument, machinery, elevator, and electric plant in good order, three thousand dollars: *Provided*, That no advertisement of any kind shall be displayed, and no articles of any kind shall be sold, in or around the Monument.

Proviso. Sales, etc., prohibited.

Building where Abraham Lincoln died.

REPAIRS OF BUILDING WHERE ABRAHAM LINCOLN DIED: For painting and miscellaneous repairs, two hundred dollars.

Old railroad station.

OLD RAILROAD STATION: For a watchman for the old railroad station building at the southwest corner of Sixth and B streets northwest, seven hundred and twenty dollars.

Engineer Department.

ENGINEER DEPARTMENT.

Rivers and harbors.

Toward the construction of works on harbors and rivers, under contract and otherwise, and within the limits authorized by law, namely:

Vol. 29, p. 202.

For works authorized by the river and harbor Act of eighteen hundred and ninety-six, as follows:

Kentucky River, Ky.

Improving Kentucky River, Kentucky: For continuing improvement in completion of contract authorization, ninety-nine thousand dollars.

Vol. 30, p. 1121.

For works authorized by the river and harbor Act of eighteen hundred and ninety-nine, as follows:

Ambrose Channel, New York Harbor.

Improving New York Harbor, New York: For continuing improvement of Ambrose Channel (formerly known as East Channel) across Sandy Hook Bar, three hundred and eighteen thousand four hundred and ninety dollars.

Ohio River below Pittsburg, Pa.

Improving Ohio River below Pittsburg, Pennsylvania: For continuing improvement in completion of contract authorization by the construction of Dams Numbered Thirteen and Eighteen, fifteen thousand dollars.[a]

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[a] The phrase "in completion of contract authorization" is erroneous.

For works authorized by the river and harbor Act of nineteen hundred and two, as follows: Vol. 32, p. 331.

Improving harbor at Cleveland, Ohio: For continuing improvement in accordance with plan for new harbor entrance and breakwater extension, three hundred and fifty thousand dollars. Cleveland, Ohio.

Improving Great Pedee River, South Carolina: For continuing improvement of upper portion of river, eleven thousand three hundred dollars. Great Pedee River, S. C.

Improving Ohio River below Pittsburg, Pennsylvania: For continuing improvement by the construction of Lock and Dam Numbered Thirty-seven, one hundred thousand dollars. Ohio River below Pittsburg, Pa.

For works authorized by the river and harbor Act of nineteen hundred and five, as follows: Vol. 33, p. 1117.

Improving harbor at Burlington, Vermont: For continuing work of repairs to breakwater, sixteen thousand eight hundred and fifty-five dollars. Burlington, Vt.

Improving Cumberland River above Nashville, Tennessee: For continuing improvement by the construction of Lock and Dam Numbered Twenty-one, fifty thousand dollars. Cumberland River above Nashville, Tenn.

Improving Hay Lake and Neebish Channels, Saint Marys River, Michigan: For continuing improvement, three hundred and fifteen thousand dollars. Saint Marys River, Mich.

For works authorized by the river and harbor Act of nineteen hundred and seven, as follows: Vol. 34, p. 1073.

Improving harbor at Algoma, Wisconsin: For continuing improvement by the construction of an outer harbor, one hundred thousand dollars. Algoma, Wis.

Improving Aransas Pass and Bay, Texas: For continuing improvement, two hundred thousand dollars. Aransas Pass and Bay, Tex.

Improving Big Sandy River, West Virginia and Kentucky: For continuing improvement by the construction of Dam Numbered One, Levisa Fork, and Dam Numbered One, Tug Fork, eighty-five thousand dollars. Big Sandy River, W. Va. and Ky.

Improving Biscayne Bay, Florida: For continuing improvement, one hundred and nineteen thousand dollars. Biscayne Bay, Fla.

Improving Black Warrior, Warrior, and Tombigbee rivers, Alabama: For continuing improvement by the construction of locks and dams, five hundred and thirty thousand dollars. Black Warrior, etc., rivers, Ala.

Improving Brazos River, Texas: For continuing improvement from Old Washington to Waco by the construction of lock and dam at Hidalgo Falls, one hundred thousand dollars. Brazos River, Tex.

Improving harbor at Bridgeport, Connecticut: For continuing improvement, forty thousand dollars. Bridgeport, Conn.

Improving harbor at Brunswick, Georgia: For continuing improvement, three hundred and three thousand dollars. Brunswick, Ga.

Calumet River, Ill. and Ind.

Improving Calumet River, Illinois and Indiana: For continuing improvement, one hundred and forty thousand dollars.

Cape Fear River, N. C.

Improving Cape Fear River, North Carolina: For continuing improvement at and below Wilmington, one hundred and fifty thousand dollars.

Cleveland, Ohio.

Improving harbor at Cleveland, Ohio: For continuing improvement in accordance with plan for new harbor entrance and breakwater extension, one hundred and twenty-five thousand dollars.

Cold Spring Inlet, N. J.

Improving Cold Spring Inlet, New Jersey: For continuing improvement, with a view to securing a depth of twenty-five feet, two hundred and thirty-six thousand two hundred dollars.

Columbia River, Oreg. and Wash.

Improving mouth of Columbia River, Oregon and Washington: For continuing improvement, one million four hundred and fifty thousand dollars.

Columbia River, Three-Mile Rapids.

Improving Columbia River at Three-Mile Rapids, Oregon and Washington: For continuing improvement of Columbia River between the foot of The Dalles Rapids and the head of Celilo Falls, Oregon and Washington, three hundred and thirty-six thousand dollars.

Cumberland River above Nashville, Tenn.

Improving Cumberland River above Nashville, Tennessee: For continuing improvement by the construction of Locks and Dams Numbered Three, Four, Five, Six, and Seven, one hundred and fifty thousand dollars.

Delaware River, Pa. and N. J.

Improving Delaware River, Pennsylvania and New Jersey: For maintenance of improvement, three hundred and seventy-five thousand dollars.

Detroit River, Mich.

Improving Detroit River, Michigan: For continuing improvement in completion of contract authorization, one hundred and fifty thousand dollars.

Auxiliary channel.

For continuing improvement of auxiliary channel in accordance with plan "B," east route, five hundred and seventy-five thousand dollars; and said channel shall hereafter be known and designated as Livingstone channel.

Galveston, Tex.

Improving harbor at Galveston, Texas: For continuing improvement by extension of the jetties and by dredging, six hundred and thirty thousand dollars.

Report on comprehensive, etc., improvement of entire harbor.

That the Secretary of War be, and he is hereby, authorized and directed to cause to be made an examination and survey of Galveston Harbor, as a whole, including Galveston Harbor, Galveston channel, Texas City channel, and Port Bolivar channel, in the State of Texas, for the purpose of establishing a broad, comprehensive, and systematic plan for the future extension, enlargement, and deepening of said harbor, so as to meet the growing needs of commerce, and to estimate the probable cost thereof; the cost of said examination and survey to be paid out of the foregoing appropriation.

Galveston ship channel and Buffalo Bayou.

Improving Galveston ship channel and Buffalo Bayou, Texas: For continuing improvement to a point at or near

the head of Long Reach, in accordance with the modified project, one hundred and forty-five thousand dollars.

Improving inland waterway on coast of Texas: For continuing improvement, two hundred and forty-five thousand dollars. Inland waterway, Texas.

Improving Grays Harbor, Washington: For continuing improvement of harbor and bar entrance by means of north jetty, three hundred thousand dollars. Grays Harbor, Wash.

Improving harbor at Hilo, Hawaii: For continuing improvement, one hundred thousand dollars. Hilo, Hawaii.

Improving harbor at Honolulu, Hawaii: For continuing improvement, two hundred thousand dollars. Honolulu, Hawaii.

Improving Kennebec River, Maine: For continuing improvement from the mouth to Gardiner, eighty-six thousand five hundred dollars. Kennebec River, Me.

Improving Kentucky River, Kentucky: For continuing improvement by the construction of Locks and Dams Numbered Twelve and Thirteen, two hundred and ten thousand dollars. Kentucky River, Ky.

Improving harbor at Ludington, Michigan: For continuing improvement, twenty thousand dollars. Ludington, Mich.

Improving harbor at Manitowoc, Wisconsin: For continuing improvement, two hundred and seventy thousand five hundred dollars. Manitowoc, Wis.

Improving harbor at Milwaukee, Wisconsin: For continuing improvement and maintenance, including harbor of refuge, three hundred and ninety-two thousand dollars. Milwaukee, Wis.

Improving Mississippi River from mouth of Ohio River to Minneapolis, Minnesota: For continuing improvement of Mississippi River from the mouth of the Ohio River to and including the mouth of the Missouri River, two hundred and fifty thousand dollars. Mississippi River. From the Ohio to the Missouri.

For continuing improvement of Mississippi River from the mouth of the Missouri River to Minneapolis, Minnesota, five hundred thousand dollars, of which amount ten thousand dollars, or so much thereof as may, in the opinion of the Secretary of War, be necessary, may be expended to repair and strengthen the levee heretofore constructed along the west bank of the Mississippi River between Flint Creek and the Iowa River. From the Missouri to Minneapolis, Minn.

Improving harbor at Mobile, Alabama: For continuing improvement, one hundred and sixty thousand dollars. Mobile, Ala.

Improving Monongahela River, Pennsylvania: For continuing construction of Lock and Dam Numbered Five, three hundred thousand dollars. Monongahela River, Pa.

Improving harbors at New Bedford and Fairhaven, Massachusetts: For continuing improvement, two hundred thousand dollars. New Bedford and Fairhaven, Mass.

Breakwater at New Haven, Connecticut: For continuing construction, one hundred and fifty thousand dollars. New Haven, Conn.

Newport, R. I. Improving harbor at Newport, Rhode Island: For continuing improvement, one hundred and twelve thousand one hundred dollars.

Ambrose Channel, New York Harbor. Improving New York Harbor, New York: For continuing improvement of Ambrose Channel, three hundred and sixty-five thousand dollars.

Norfolk, Va. Improving harbor at Norfolk, Virginia: For continuing improvement of harbor and approaches, from deep water in Hampton Roads to the junction of the eastern and southern branches, including removal of shoals at the mouth of the eastern branch, one hundred and twenty-five thousand dollars.

Oakland, Cal. Improving Harbor at Oakland, California: For continuing improvement, one hundred and ninety thousand dollars.

Ohio River. Locks and dams, No. 8. Improving Ohio River below Pittsburg, Pennsylvania: For continuing construction of Lock and Dam Numbered Eight, one hundred and thirty-six thousand dollars.

No. 11. For continuing construction of Lock and Dam Numbered Eleven, two hundred thousand dollars.

Nos. 13 and 18. For continuing construction of Locks and Dams Numbered Thirteen and Eighteen, forty-five thousand dollars.

No. 26. For continuing construction of Lock and Dam Numbered Twenty-six, one hundred and ten thousand dollars.

Osage River, Mo. Improving Osage River, Missouri: For continuing improvement, one hundred thousand dollars.

Ouachita and Black rivers, Ark. and La. Improving Ouachita River, Arkansas and Louisiana: For continuing improvement of Ouachita and Black rivers, Louisiana and Arkansas, by the construction of Lock and Dam Numbered Two, near Catahoula Shoals, Louisiana, and Lock and Dam Numbered Eight, near Franklin Shoals, Arkansas, two hundred and twenty-five thousand dollars.

Passaic River, N. J. Improving Passaic River, New Jersey: For continuing improvement of channel in Newark Bay and Passaic River, sixty-five thousand dollars.

Patapsco River, Md. Improving Patapsco River, Maryland: For continuing improvement of channel to Baltimore, including shoals in Chesapeake Bay off York Spit, seven hundred and fifty thousand dollars.

Point Judith, R. I. Harbor of Refuge at Point Judith, Rhode Island: For continuing improvement by construction of the easterly or shore arm of the breakwater, one hundred and seventy thousand dollars.

Rappahannock River, Va. Improving Rappahannock River, Virginia: For continuing improvement in accordance with the modified project, fifty-eight thousand dollars.

Sabine Pass, Tex. Improving Sabine Pass, Texas: For continuing improvement, one hundred and ninety thousand dollars.

Saint Michael Canal, Alaska. Improving Saint Michael Canal, Alaska: For completing improvement, one hundred and fifty thousand dollars.

Sandy Bay, Mass. Harbor of Refuge at Sandy Bay, Cape Ann, Massachusetts: For continuing improvement, twenty-five thousand dollars.

Improving harbor at San Juan, Porto Rico: For continuing improvement, two hundred and twenty thousand dollars. San Juan, P. R.

Improving harbor at San Luis Obispo, California: For continuing improvement, sixty thousand dollars. San Luis Obispo, Cal.

Improving harbor at Savannah, Georgia: For continuing improvement, three hundred thousand dollars. Savannah, Ga.

Maintenance of South Pass Channel, Mississippi River: For continuing improvement and maintenance, fifty thousand dollars. Mississippi River, South Pass Channel.

Improving harbors on the coast of Mississippi: For completing construction of dredge for use in said harbors and the channels adjacent thereto, one hundred and twenty-five thousand dollars. Mississippi coast, dredge.

Improving Southwest Pass, Mississippi River: For continuing improvement, one million one hundred and seventy thousand dollars. Mississippi River, Southwest Pass.

Improving Tennessee River below Chattanooga, Tennessee, Alabama, and Kentucky: For continuing improvement at Colbert and Bee Tree shoals, ninety-three thousand dollars. Tennessee River below Chattanooga, Tenn.

Improving Trinity River, Texas: For the construction of locks and dams, ninety thousand dollars. Trinity River, Tex.

Improving waterway from Franklin to Mermentau, Louisiana: For continuing improvement, one hundred thousand dollars. Waterway, Franklin to Mermentau, La.

Waterway from Pamlico Sound to Beaufort Inlet, North Carolina: For continuing improvement, one hundred and seventy thousand dollars. Waterway, Pamlico Sound to Beaufort Inlet, N. C.

Improving Withlacoochee River, Florida: For improvement of channel following route F, one hundred thousand dollars. Withlacoochee River, Fla.

Improving Mississippi River: For continuing improvement of Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission, two million dollars. Mississippi River Commission.

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MISCELLANEOUS OBJECTS, WAR DEPARTMENT. Miscellaneous.

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ENLARGEMENT OF GOVERNORS ISLAND, NEW YORK: For continuing plan of improvement for the enlargement of Governors Island, New York Harbor, by wharf work, dredging, bulkhead, and filling, seventy-five thousand dollars.[a] Governors Island, N. Y. Enlarging.

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IMPROVEMENT OF THE YELLOWSTONE NATIONAL PARK: For maintenance and repair of improvements, sixty-five Yellowstone Park.

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[a] All of this appropriation is for work assigned to the Engineer Department.

thousand dollars, to be expended by and under the direction of the Secretary of War; and to be immediately available.

Mount Rainier Park.

MOUNT RAINIER NATIONAL PARK: For continuing the construction of the wagon road into said park, from the west, heretofore surveyed and commenced, under the direction of the Secretary of War, to be immediately available, fifty thousand dollars.

* * * * *

Maps.

MAPS, WAR DEPARTMENT: For publication of engineer maps for use of the War Department, inclusive of war maps, five thousand dollars.

Survey of northern and northwestern lakes.

SURVEY OF NORTHERN AND NORTHWESTERN LAKES: For survey of northern and northwestern lakes, including all necessary expenses for preparing, correcting, extending, printing, and issuing charts and bulletins, and of investigating lake levels, with a view to their regulation, to be immediately available, one hundred and twenty-five thousand dollars.

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California Débris Commission.

CALIFORNIA DÉBRIS COMMISSION: For defraying the expenses of the Commission in carrying on the work authorized by the Act of Congress approved March first eighteen hundred and ninety-three, fifteen thousand dollars.

New York Harbor. Deposits.

HARBOR OF NEW YORK: For prevention of obstructive and injurious deposits within the harbor and adjacent waters of New York City:

Inspectors.

For pay of inspectors, deputy inspectors, office force, and expenses of office, ten thousand two hundred and sixty dollars.

Crews, etc.

For pay of crews and maintenance of six steam tugs and one launch, seventy-five thousand dollars.

In all, eighty-five thousand two hundred and sixty dollars.

International Waterways Commission.

Vol. 32, p. 373.

INTERNATIONAL WATERWAYS COMMISSION: For continuing the work of investigation and report by the International Waterways Commission, authorized by section four of the river and harbor Act approved June thirteenth, nineteen hundred and two, twenty thousand dollars.

* * * * *

Sums for salaries to be in full.

SEC. 9. That all sums appropriated by this Act for salaries of officers and employees of the Government shall be in full for such salaries for the fiscal year nineteen hundred and nine, and all laws or parts of laws in conflict with the provisions of this Act be, and the same are hereby, repealed.

* * * * *

Approved, May 27, 1908.

CHAP. 202.—An Act Making appropriations for fortifications and other works of defense, for the armament thereof, for the procurement of heavy ordnance for trial and service, and for other purposes.

May 27, 1908. [H. R. 19355.]

[Public, No. 143.]

Vol. 35, p. 392.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the sums of money herein provided for be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to be available until expended, namely:

Fortifications appropriations.

FORTIFICATIONS AND OTHER WORKS OF DEFENSE.

UNDER THE ENGINEER DEPARTMENT.

For construction of gun and mortar batteries, three hundred thousand dollars.

Gun and mortar batteries.

For modernizing older emplacements, the Secretary of War is authorized to apply the sum of twenty-two thousand eight hundred and fifty-seven dollars and eighteen cents, remaining unexpended from the appropriation for pneumatic dynamite battery at San Francisco Harbor, California, contained in the deficiency appropriation Act approved July seventh, eighteen hundred and ninety-eight, and the sum of one hundred and forty-two thousand four hundred and four dollars and eighteen cents remaining unexpended from the appropriation for pneumatic dynamite batteries, contained in the fortification appropriation Act approved May twenty-fifth, nineteen hundred.

Modernizing older emplacements.

Unexpended balances.

Vol. 30, p. 704.

Vol. 31, p. 184.

For construction of fire-control stations and accessories, including purchase of lands and rights of way, and for the purchase and installation of necessary lines and means of electrical communication, including telephones, dial and other telegraphs, wiring and all special instruments, apparatus, and materials, coast signal apparatus, and salaries of electrical experts, engineers, and other necessary employees connected with the use of coast artillery; for the purchase, manufacture, and test of range finders and other instruments for fire control at the fortifications, and the machinery necessary for their manufacture at the arsenals, two hundred and seventy thousand two hundred and fifty-six dollars.

Fire-control stations, etc.

Range finders, etc.

For supplying current for power and lighting at seacoast fortifications, three hundred and forty-eight thousand eight hundred and eighty-eight dollars.

Electric current supply.

For the procurement or reclamation of land, or right pertaining thereto, needed for the site, location, construction, or prosecution of works for fortifications and coast defenses, one hundred and twenty-one thousand and forty-eight dollars: *Provided*, That not more than twenty-one thousand and forty-eight dollars of said amount shall be paid to any person for property at, near, or adjoining

Sites for coast defenses, etc.

Provisos. Fort Armistead, Md. Maximum.

Fort Armistead, Anne Arundel County, Maryland: *And provided further*, That no part thereof shall be so paid until such person receipts in full for all claims of every kind against the United States.

Receipts.

San Pedro, Cal.
Seacoast fortifications.
Report on necessity of, etc.

The Secretary of War is directed, by a suitable board, to investigate and report fully to Congress as to the advisability and necessity of seacoast fortifications for the protection of the harbor of San Pedro, California, and the cities in that vicinity, and if such fortifications are deemed advisable or necessary furnish an estimate of the cost of sites and fortifications separately.

Searchlights.

For purchase and installation of searchlights for the defenses of our most important harbors, two hundred and ten thousand dollars.

Preservation, etc.

For the protection, preservation, and repair of fortifications for which there may be no special appropriation available, two hundred and twenty-five thousand dollars.

Fort Moultrie, S. C.
Protecting wall.

To complete the construction of about four thousand eight hundred linear feet of wall necessary for the protection of Fort Moultrie, Sullivans Island, South Carolina, from the effects of storms, one hundred and twenty-five thousand six hundred dollars.

Pensacola, Fla.
Protection to batteries, etc.

To complete the repair and restoration of batteries and other structures appurtenant to the defenses of Pensacola and retaining walls to protect the batteries from floods, fifty-nine thousand three hundred and fifty-five dollars.

* * * * *

Mobile, Ala.
Repair of defenses.

To complete the repair and restoration of batteries and other structures appurtenant to the defenses of Mobile, Alabama, and rebuilding sea walls and groins for protection of the sites of the fortifications and of the garrison posts, five hundred and eighty-nine thousand five hundred dollars.

Plans.

For preparation of plans for fortifications, five thousand dollars.

Electric plants.

For tools, electrical and engine supplies and appliances, to be furnished by the Engineer Department, for the use of the troops for maintaining and operating electric light and power plants in gun and mortar batteries, forty-four thousand five hundred dollars.

Sea walls.

For construction of sea walls and embankments, fifty thousand dollars.

Torpedo structures.

For preservation and repair of structures erected for the torpedo defense of the United States, fifteen thousand dollars.

Submarine mines.

For the construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories, one hundred and seventy-five thousand dollars, to be expended by the Engineer Department.

* * * * *

FORTIFICATIONS IN INSULAR POSSESSIONS.

Insular possessions.

ENGINEER DEPARTMENT.

Engineer Department.

For construction of seacoast batteries, as follows:

Seacoast batteries.

In the Hawaiian Islands, four hundred thousand dollars;

Hawaiian Islands.

In the Philippine Islands, nine hundred and fifty-four thousand dollars;

Philippine Islands.

In all, one milion three hundred and fifty-four thousand dollars.

For installation of electric plants at the defenses of the following localities:

Electric plants.

In the Hawaiian Islands, twenty thousand dollars;

Hawaiian Islands.

In the Philippine Islands, one hundred and fifteen thousand dollars;

Philippine Islands.

In all, one hundred and thirty-five thousand dollars.

For construction of fire-control stations and accessories, including purchase of lands and rights of way, and for the purchase and installation of necessary lines and means of electrical communications, including telephones, dial and other telegraphs, wiring and all special instruments, apparatus and materials, coast signal apparatus, and salaries of electrical experts, engineers, and other necessary employees connected with the use of coast artillery; for the purchase, manufacture, and test of range finders and other instruments for fire control at the fortifications, and the machinery necessary for their manufacture at the arsenals, two hundred and forty-three thousand dollars.

Fire-control stations, etc.

Range finders, etc.

For purchase and installation of searchlights for the defenses of most important harbors, as follows:

Searchlights.

In the Hawaiian Islands, forty-seven thousand five hundred dollars;

Hawaiian Islands.

In the Philippine Islands, one hundred and eighty thousand dollars;

Philippine Islands.

In all, two hundred and twenty-seven thousand five hundred dollars.

For the construction of mining casemates, cable galleries, torpedo storehouses, cable tanks, and other structures necessary for the operation, preservation, and care of submarine mines and their accessories at the defenses of the Hawaiian Islands, one hundred and twenty-nine thousand dollars, to be expended by the Engineer Department.

Mining casemates, etc., Hawaiian Islands.

* * * * *

For procurement or reclamation of land, or right pertaining thereto, needed for the site, location, construction, or prosecution of works for fortifications and coast defenses in the Philippine Islands, five thousand dollars.

Site.

* * * * *

BOARD OF ORDNANCE AND FORTIFICATION.

Board of Ordnance and Fortifications.

Purchases, etc.

To enable the Board to make all needful and proper purchases, experiments, and tests to ascertain, with a view to their utilization by the Government, the most effective guns, small arms, cartridges, projectiles, fuses, explosives, torpedoes, armor plates, and other implements and engines of war, and to purchase or cause to be manufactured, under authority of the Secretary of War, such guns, carriages, armor plates, and other war material as may, in the judgment of the Board, be necessary in the proper discharge of the duty devolved upon it by the Act approved September twenty-second, eighteen hundred and eighty-eight; to pay the salary of the civilian member of the Board of Ordnance and Fortification provided by the Act of February twenty-fourth, eighteen hundred and ninety-one, and for the necesary traveling expenses of said member when traveling on duty as contemplated in said Act; for the payment of the necessary expenses of the Board, including a per diem allowance to each officer detailed to serve thereon, when employed on duty away from his permanent station, of two dollars and fifty cents a day; and for the test of experimental guns, carriages, and other devices procured in accordance with the recommendation of the Board of Ordnance and Fortification, fifty thousand dollars, the expenditure of which shall be made by the several bureaus of the War Department heretofore having jurisdiction of the same, or by the Board itself, as the Secretary of War may direct: *Provided*, That before any money shall be expended in the construction or test of any gun, gun carriage, ammunition, or implements under the supervision of the said Board, the Board shall be satisfied, after due inquiry, that the Government of the United States has a lawful right to use the inventions involved in the construction of such gun, gun carriage, ammunition, or implements, or that the construction or test is made at the request of a person either having such lawful right or authorized to convey the same to the Government.

Vol. 25, p. 489.

Civilian member. Salary.

Vol. 26, p. 769.

Per diem, tests, etc.

Proviso. Right to use invention.

Material to be of American manufacture.

That all material purchased under the provisions of this Act shall be of American manufacture, except in cases when, in the judgment of the Secretary of War, it is to the manifest interest of the United States to make purchases in limited quantities abroad. Such material purchased in limited quantities shall be admitted free of duty, as shall other similar material furnished without charge.

Approved, May 27, 1908.

CHAP. 203.—An Act To authorize the construction of a railroad siding to the United States navy-yard, and for other purposes.

May 27, 1908.
[H. R. 20120.]
[Public, No. 144.]
Vol. 35, p. 397.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Philadelphia, Baltimore and Washington Railroad Company be, and it is hereby, authorized and directed to construct a single branch track or siding from its present main line, at some point, to be approved by the Commissioners of the District of Columbia, between the bridge over the Anacostia River at Pennsylvania avenue southeast, and one thousand feet westerly therefrom; thence extending by curve in a southwestwardly direction across square south of one thousand and eighty, to Fifteenth street, east; thence southwestwardly across square south one thousand and sixty-seven, on a line generally parallel to the center line of Water street, at such distance between the center line of Water street and the present approved north bulkhead line of the Anacostia River as shall be approved by the Commissioners of the District of Columbia, crossing Fifteenth street southeast, Fourteenth street southeast, Thirteenth street southeast, Twelfth street southeast, M and N streets southeast, and Virginia avenue; thence in a southwestwardly direction by curve or otherwise, as the Commissioners of the District of Columbia shall approve, crossing Twelfth street southeast, and square south of one thousand and one, to the north abutment of the Anacostia River bridge at the foot of Eleventh street southeast; thence passing under the north end of the said Anacostia River bridge, at such point as may be determined by the Commissioners of the District of Columbia; thence across Eleventh street southeast, square nine hundred and seventy-nine, Tenth street southeast, square nine hundred and fifty-five, and Ninth street southeast, on a line generally parallel to the north bulkhead line of the Anacostia River, as now approved, and between it and one hundred feet distant therefrom, as may be determined by the Commissioners of the District of Columbia, to a connection with the track system of the United States Navy-Yard.

District of Columbia.
Philadelphia, Baltimore, and Washington Railroad Company may construct siding to navy-yard.
Route.

SEC. 2. That the location of said track and the grade thereof and the plans of construction outside of the United States Navy-Yard, shall be approved by the Commissioners of the District of Columbia, and the said Commissioners are also authorized and empowered to make, from time to time, all needful regulations for the movement of trains, cars, and locomotives over the same: *Provided*, That the Commissioners of the District of Columbia shall, as far as consistent with the public interests, cause said railroad track to be located on public grounds and streets.

Plans, etc., approved by Commissioners.
Regulations.
Proviso.
Location on public grounds, etc.

The Philadelphia, Baltimore and Washington Railroad Company shall also pave such crossings or other

Paving.

portions of public space occupied by said tracks, and two feet exterior to the rails thereof, as the Commissioners of the District of Columbia may require, and keep the same in repair at all times.

Repairs.

Side-tracks, etc.

SEC. 3. That it shall be the duty of the Commissioners of the District of Columbia, and they are hereby authorized and empowered, upon request of the railroad company, to grant the Philadelphia, Baltimore and Washington Railroad Company, permission to lay, maintain, and use side-tracks and sidings, from the branch track herein authorized, south of said branch track between Twelfth and Fifteenth streets east, and also into squares nine hundred and fifty-five, nine hundred and seventy-nine, south of one thousand and twenty-five, and east of one thousand and twenty-five, and south of one thousand and one, and south of one thousand and forty-eight: *Provided*, That such tracks or sidings shall be laid and maintained under the direction of the said Commissioners in such manner as to least interfere with the free and unobstructed use of the public streets.

Proviso. No obstruction of public streets.

Cost paid by railroad.

SEC. 4. That the entire cost and expense of obtaining the necessary right of way, and the entire cost and expense of constructing the branch track, herein authorized, to a connection with the track system of the navy-yard, shall be paid and defrayed by the Philadelphia, Baltimore and Washington Railroad Company, but the said Philadelphia, Baltimore and Washington Railroad Company shall not acquire any riparian rights by reason of the location of said track through public space or through any right of way, necessary to be acquired.

Riparian rights not acquired.

Occupation of public space.

SEC. 5. That where the line as approved by said Commissioners lies within the bed of any public highway or through any public space, said company is hereby given the right to occupy such portion of said highway or public space as may be approved by said Commissioners, and where such approved line crosses private property, the said railroad company is hereby authorized to acquire a sufficient right of way not exceeding sixty-six feet in width by purchase, and in the event that such right of way can not be purchased at a price satisfactory to said railroad company, authority is hereby conferred upon said railroad company to condemn the land necessary for such right of way, in the manner and by the method and processes provided by sections six hundred and forty-eight to six hundred and sixty-three, both inclusive, of the Revised Statutes relating to the District of Columbia, which said sections, despite any repeal thereof, are hereby reenacted in full force and effect, for the purposes contemplated by this Act, and are especially enacted to like effect as if the same were incorporated herein at length: *Provided*, That in every case where an assessment for damages or an award shall have been returned by the appraisers, the company, upon paying into court the amount so assessed or awarded, may enter upon and take

Right of way over private property by purchase.

By condemnation.

R. S., D. C., secs. 648-663, pp. 78, 79.

Reenactment.

Proviso. Possession.

possession of the land covered thereby, irrespective of whether exceptions to such assessment or award shall be filed or not, and any subsequent proceedings shall not interfere with or affect such possession, but shall only affect the amount of compensation to be paid.

Time of completion.

SEC. 6. That the construction of the track or siding herein provided for shall be begun within six months from the date of the passage of this Act, and shall be completed within two years from said date, and pending such construction, the said Philadelphia, Baltimore and Washington Railroad Company is hereby authorized to maintain its present track connection with the United States Navy-Yard by means of a single track on K street and Canal street southeast, either as at present located or as the same may hereafter be relocated, in whole or in part, with the approval of the Commissioners of the District of Columbia, but at the expiration of said two years said railroad company shall at its own expense remove said present track connection and restore the surface of the streets over which the same is laid, to the approval of said Commissioners: *Provided*, That in case any other railroad company may desire to connect with the track herein authorized and required to be constructed it shall have the right so to do; such connecting road shall have the right to use the track herein authorized on terms and conditions satisfactory to the said Philadelphia, Baltimore and Washington Railroad Company, its successors or assigns, or in case of failure to agree on terms and conditions of joint use then on such terms and conditions as the supreme court of the District of Columbia may determine to be equitable and just.

Use of present tracks, etc.

Removal of present tracks.

Proviso. Use by other roads.

Failure to agree on terms.

Repeal.

SEC. 7. That all Acts or parts of Acts inconsistent with the provisions hereof be, and the same are hereby, repealed.

Amendment.

SEC. 8. That Congress reserves the right to alter, amend, or repeal this Act.

Approved, May 27, 1908.

CHAP. 212.—An Act To amend the laws relating to navigation, and for other purposes.

May 28, 1908. [H. R. 21815.]

[Public, No. 152.] Vol. 35, pp. 424, 426.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, * * *

* * * * *

New York Harbor. Vol. 28, p. 360, amended.

SEC. 8. That section three of the Act of August eighteenth, eighteen hundred and ninety-four, entitled "An Act making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes," be, and the same hereby is, amended so as to read as follows, sixty days after the passage of this Act:

Vol. 25, p. 209.

Injurious deposits forbidden.

"SEC. 3. That section three of the Act to prevent obstructive and injurious deposits within the harbor and adjacent waters of New York City, by dumping or otherwise, and to punish and prevent such offenses, approved June twenty-ninth, eighteen hundred and eighty-eight, shall be, and hereby is, amended so as to read as follows:

Supervisor to designate place of deposits.

"'SEC. 3. That in all cases of receiving on board of any scows or boats such forbidden matter or substance as herein described, the owner or master, or person acting in such capacity on board of such scows or boats, before proceeding to take or tow the same to the place of deposit, shall apply for and obtain from the supervisor of the harbor appointed hereunder a permit defining the precise limits within which the discharge of such scows or boats may be made; and it shall not be lawful for the owner or master, or person acting in such capacity, of any tug or towboat to tow or move any scow or boat so loaded with such forbidden matter until such permit shall have been obtained; and every person violating the foregoing provisions of this section shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine of not more than one thousand nor less than five hundred dollars, and in addition thereto the master of any tug or towboat so offending shall have his license revoked or suspended for a term to be fixed by the judge before whom tried and convicted.

Permits.

Deposits elsewhere prohibited.

Penalty for proceeding without license.

Punishment for discharging at unauthorized place.

"'And any deviation from such dumping or discharging place specified in such permit shall be a misdemeanor, and the owner and master, or person acting in the capacity of master, of any scows or boats dumping or discharging such forbidden matter in any place other than that specified in such permit shall be liable to punishment therefor as provided in section one of the said Act of June twenty-ninth, eighteen hundred and eighty-eight; and the owner and master, or person acting in the capacity of master, of any tug or towboat towing such scows or boats shall be liable to equal punishment with the owner and master, or person acting in the capacity of master, of the scows or boats; and, further, every scowman or other employee on board of both scows and towboats shall be deemed to have knowledge of the place of dumping specified in such permits, and the owners and masters, or persons acting in the capacity of masters, shall be liable to punishment, as aforesaid, for any unlawful dumping, within the meaning of this Act or of the said Act of June twenty-ninth, eighteen hundred and eighty-eight, which may be caused by the negligence or ignorance of such scowman or other employee; and, further, neither defect in machinery nor avoidable accidents to scows or towboats, nor unfavorable weather, nor improper handling or moving of scows or boats of any kind whatsoever shall operate to release the owners and master and employees of scows and towboats from the penalties hereinbefore mentioned.

Persons liable.

Liability of owners, etc.

Vol. 25, p. 209.

"'Every scow or boat engaged in the transportation of dredgings, earth, sand, mud, cellar dirt, garbage, or other offensive material of any description shall have its name or number and owner's name painted in letters and numbers at least fourteen inches long on both sides of the scow or boat; these names and numbers shall be kept distinctly legible at all times, and no scow or boat not so marked shall be used to transport or dump any such material. Each such scow or boat shall be equipped at all times with a life line or rope extending at least the length of and three feet above the deck thereof, such rope to be attached to the coaming thereof, also with a life-preserver and a life buoy for each person on board thereof, also with anchor to weigh not less than two hundred and seventy-five pounds, and at least one hundred feet of cable attached thereto; a list of the names of all men employed on any such scow or boat shall be kept by the owner or master thereof and the said list shall be open to the inspection of all parties. Failure to comply with any of the foregoing provisions shall render the owner of such scow or boat liable upon conviction thereof to a penalty of not more than five hundred dollars.

Boats to have name, etc., painted.

Life lines, etc., required.

List of employees.

Penalty for failure.

"'The supervisor of the harbor of New York, designated as provided in section five of the said Act of June twenty-ninth, eighteen hundred and eighty-eight, is authorized and directed to appoint inspectors and deputy inspectors, and, for the purpose of enforcing the provisions of this Act and of the Act aforesaid, and of detecting and bringing to punishment offenders against the same, the said supervisor of the harbor, and the inspectors and deputy inspectors so appointed by him, shall have power and authority:

Inspectors authorized. Vol. 25, p. 210.

Duties.

"'First. To arrest and take into custody, with or without process, any person or persons who may commit any of the acts or offenses prohibited by this section and by the Act of June twenty-ninth, eighteen hundred and eighty-eight, aforesaid, or who may violate any of the provisions of the same: *Provided*, That no person shall be arrested without process for any offense not committed in the presence of the supervisor or his inspectors or deputy inspectors, or either of them: *And provided further*, That whenever any such arrest is made the person or persons so arrested shall be brought forthwith before a commissioner, judge, or court of the United States for examination of the offenses alleged against him; and such commissioner, judge, or court shall proceed in respect thereto as authorized by law in case of crimes against the United States.

Arrests.

Provisos. Process.

Custody of offender.

"'Second. To go on board of any scow or towboat engaged in unlawful dumping of prohibited material, or in moving the same without a permit, as required in this section of this Act, or otherwise violating any of the pro-

Seizure of boats.

visions of this section of this Act, and to seize and hold said boats until they are discharged by action of the commissioner, judge, or court of the United States before whom the offending persons are brought.

Custody of witness.

"'Third. To arrest and take into custody any witness or witnesses to such unlawful dumping of prohibited material, the said witnesses to be released under proper bonds.

Accompanying towboats.

"'Fourth. To go on board of any towboat having in tow scows or boats loaded with such prohibited material, and accompany the same to the place of dumping, whenever such action appears to be necessary to secure compliance with the requirements of this Act and of the Act aforesaid.

Inspecting gas, etc., works.

"'Fifth. To enter gas and oil works and all other manufacturing works for the purpose of discovering the disposition made of sludge, acid, or other injurious material, whenever there is good reason to believe that such sludge, acid, or other injurious material is allowed to run into the tidal waters of the harbor in violation of section one of the aforesaid Act of June twenty-ninth, eighteen hundred and eighty-eight.

Penalty for bribery.

"'Every person who, directly or indirectly, gives any sum of money or other bribe, present, or reward, or makes any offer of the same to any inspector, deputy inspector, or other employee of the office of the supervisor of the harbor with intent to influence such inspector, deputy inspector, or other employee to permit or overlook any violation of the provisions of this section or of the said Act of June twenty-ninth, eighteen hundred and eighty-eight, shall, on conviction thereof, be fined not less than five hundred dollars nor more than one thousand dollars, and be imprisoned not less than six months nor more than one year.

Return of permits.

"'Every permit issued in accordance with the provisions of this section of this Act, which may not be taken up by an inspector or deputy inspector, shall be returned within four days after issuance to the office of the supervisor of the harbor; such permit shall bear an indorsement by the master of the towboat, or the person acting in such capacity, stating whether the permit has been used, and, if so, the time and place of dumping. Any person violating the provisions of this section shall be liable to a fine of not more than five hundred dollars nor less than one hundred dollars.'"

Indorsement.

Penalty.

* * * * *

Approved, May 28, 1908.

CHAP. 213.—An Act Authorizing the Secretary of War to remove certain obstructions to navigation from the main ship channel, Key West Harbor, Florida, and for other purposes.

May 28, 1908. [H. R. 22009.]

[Public, No. 153.]

Vol. 35, p. 429.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of War be, and he is hereby, authorized to remove, or cause to be removed, certain reefs from the main ship channel, Key West Harbor, Florida, mentioned in a report made by Lieutenant L. H. Beach to the Secretary of War on February first, nineteen hundred and eight, and the sum of five thousand dollars of the amount heretofore appropriated for improving the harbor at Key West and entrance thereto under the river and harbor Act approved March second, nineteen hundred and seven, or so much of said sum of five thousand dollars as may be necessary, is hereby made available for such purpose.

Harbors, etc. Key West Harbor, Fla. Removal of obstructions from main ship channel.

Vol. 34, p. 1086.

SEC. 2. That the unexpended balance of the amount heretofore appropriated for the improvement of Chicago Harbor, or so much thereof as may be deemed advisable, be, and the same is hereby, made available, in the discretion of the Secretary of War, for expenditure on the existing project for the Chicago River.

Chicago River. Unexpended balance. Vol. 34, p. 1102.

SEC. 3. That so much as may be necessary of the amount heretofore appropriated, or authorized to be appropriated, for the maintenance of the South Pass of the Mississippi River, or for examinations and surveys of the South Pass of the Mississippi River, or for the improvement of the Southwest Pass of the Mississippi River, may, in the discretion of the Secretary of War, on the recommendation of the Chief of Engineers, United States Army, be used in dredging shoals in the said river between Cubits Gap and the Head of the Passes whenever it may become necessary to secure a depth of channel through said shoals of thirty-five feet, with a practical width.

Mississippi River, South Pass. Dredging shoals. Vol. 34, p. 739.

SEC. 4. That the Secretary of War may, in his discretion, apply the whole or any part of the unexpended balance of the amount heretofore appropriated for the improvement of the Duluth-Superior Harbor, Minnesota, to dredging inside the Duluth entrance thereto, as recommended in House Document Numbered Two hundred and twenty-one, Sixtieth Congress, first session.

Duluth-Superior Harbor, Minn. Dredging. Vol. 34, p. 738.

SEC. 5. That the provision in the river and harbor Act approved March second, nineteen hundred and seven, relating to the construction of the Sandy Lake Reservoir Dam, Minnesota, is hereby amended by striking out the words "without a lock for steamboats."

Sandy Lake Reservoir Dam, Minn. Vol. 34, p. 1105, amended.

SEC. 6. That the Secretary of War be, and he is hereby, authorized, in his discretion, to expend and to enter into a contract or contracts for the expenditure of so much as may be necessary of the amount heretofore appropriated,

Milwaukee, Wis. Improvement of Kinnickinnick River.

or authorized to be appropriated, for the improvement of the harbor at Milwaukee, Wisconsin, for the improvement of the Kinnickinnick River, or any part thereof inside the harbor, as heretofore provided by law, whenever and as soon as the city of Milwaukee shall have complied with the provisions set forth in House Document Numbered One hundred and twenty, Fifty-eighth Congress, second session, and authorized by the river and harbor Act, approved March third, nineteen hundred and five, and as amended by the Act entitled "An Act to amend the river and harbor Act of March third, nineteen hundred and five," approved June thirtieth, nineteen hundred and six, so far as said provisions apply to the improvement of said Kinnickinnick River or any part thereof.

Vol. 33, p. 1138.

Vol. 34, p. 819.

Mobile Harbor, Ala. Dredging.

Vol. 34, p. 1087.

SEC. 7. That the whole or any part of the amount heretofore authorized to be appropriated for the construction of a dredge for Mobile Harbor, Alabama, with the exception of five thousand dollars for the preparation of plans for said dredge, may be used for dredging said harbor, and the Secretary of War, in his discretion, may enter into a contract or contracts for the performance of the work.

Neversink and Delaware rivers, N. Y.

Vol. 34, p. 1116.

Scope of survey enlarged.

SEC. 8. That to make effective the provision in the river and harbor Act approved March second, nineteen hundred and seven, for a survey of the Neversink River, New York, with a view to the removal of bars and other obstructions at and near its mouth, the scope of such survey be enlarged so as to include the Delaware River at and near the mouth of the Neversink River.

Approved, May 28, 1908.

May 29, 1908. [S. 2295.]

[Public, No. 159.]

Vol. 35, p. 464.

CHAP. 219.—An Act To extend the time within which the Washington and Western Maryland Railroad Company shall be required to complete the road of said company under the provisions of an Act of Congress approved March second, eighteen hundred and eighty-nine, as amended by an Act of Congress approved June twenty-eighth, nineteen hundred and six.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the time within which the Washington and Western Maryland Railroad Company is required to complete and put in operation its railroad in the District of Columbia under the provisions of an Act of Congress approved March second, eighteen hundred and eighty-nine, as amended by an Act of Congress approved June twenty-eighth, nineteen hundred and six, be, and the same is hereby, extended for the term of eighteen months from the twenty-eighth day of December, nineteen hundred and seven, and all of the franchises, rights, and powers conferred by said Acts, or either of them, upon said railroad company, may be enjoyed and exercised as fully and

District of Columbia.

Washington and Western Maryland Railroad Company.

Vol. 25, p. 876.

Time of construction extended.

Vol. 34, p. 536, amended.

completely as if said railroad had been completed and put in operation prior to the twenty-eighth day of December, anno Domini nineteen hundred and seven: *Provided*, That within one month after the approval of this Act the said Washington and Western Maryland Railroad Company shall deposit with the collector of taxes of the District of Columbia the sum of two thousand dollars to guarantee the construction of said railroad within the time herein extended. If this sum is not so deposited this Act shall be void; if this sum is deposited and the said railroad company shall fail to construct and have in operation the said railroad, within the time herein prescribed, the said sum shall be forfeited to the District of Columbia and this Act shall be void.

Proviso. Deposit.

Forfeiture.

Approved, May 29, 1908.

CHAP. 220.—An Act Authorizing a resurvey of certain townships in the State of Wyoming, and for other purposes.

May 29, 1908 [S. 6190.]

[Public, No 160.] Vol. 35, pp 465, 471.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, * * *

* * * * *

SEC. 26. That the following-described land, to wit, the southeast quarter of the northwest quarter of section thirty, and the point of land in section eighteen extending from lot one in section nineteen, omitted from the original United States land survey, but which is shown upon the plat of survey made under the direction of the War Department by the United States engineer office at Saint Paul for the Gull Lake Reservoir, in Minnesota, which said land was reserved for reservoir purposes and the reservation approved by the President January eighteenth, eighteen hundred and ninety-six, in township one hundred and thirty-four north, of range twenty-nine west, in the State of Minnesota, be, and the same hereby is, restored to the public domain subject to homestead entry; and all prior rights of settlement and entry, or attempted entry, are hereby reserved to the occupant and claimant of the land, to be passed upon and determined by the Commissioner of the General Land Office: *Provided, however*, That any homestead entry of said land or final certificate or patent that may be issued therefor shall be subject to the right of the United States to construct and maintain a dam for reservoir purposes at Gull Lake and to flood any part of said land by means of said dam.

Gull Lake Reservoir, Minn.

Land reserved for, restored to public domain.

Prior rights reserved.

Proviso. Reservation for dam.

* * * * *

Approved, May 29, 1908.

May 29, 1908. [S. R. 6.]

[Pub. Res., No. 31.] Vol. 35, p. 579.

[No. 31.] Joint Resolution Directing the selection of a site and the erection of a pedestal for a bronze statue in Washington, District of Columbia, in honor of John Witherspoon.

District of Columbia. Monument to John Witherspoon in. Commission to select site, etc.

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That the chairman of the Committee on the Library of the Senate, the chairman of the Committee on the Library of the House of Representatives, the Secretary of War, and the chairman of the Witherspoon Memorial Association are hereby created a commission to select and prepare a site on property belonging to the United States in the city of Washington, other than the grounds of the Capitol or Library of Congress, and erect thereon a suitable pedestal for a statue in bronze of John Witherspoon, a signer of the Declaration of Independence, to be provided by the Witherspoon Memorial Association.

Appropriation.

SEC. 2. That for the preparation of the site so selected and the erection of the pedestal the sum of four thousand dollars, or so much thereof as may be necessary, is hereby appropriated out of any money in the Treasury not otherwise appropriated: *Provided*, That the design for said statue shall be approved by the commission herein created.

Proviso. Design.

Approved, May 29, 1908.

May 30, 1908. [H. R. 21946.]

[Public, No. 167.] Vol. 35, pp. 478, 491, 493, 497, 498, 516.

CHAP. 227.—An Act Making appropriations to supply deficiencies in the appropriations for the fiscal year ending June thirtieth, nineteen hundred and eight, and for prior years, and for other purposes.

Deficiencies appropriations.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, out of any money in the Treasury not otherwise appropriated, to supply deficiencies in the appropriations for the fiscal year nineteen hundred and eight, and for prior years, and for other objects hereinafter stated, namely:

* * * * *

Treasury Department.

TREASURY DEPARTMENT.

* * * * *

Public buildings.

PUBLIC BUILDINGS.

Authorizations in omnibus act. Vol. 35, p. 520.

Toward amounts requisite for public buildings, authorized under the provisions of an Act entitled "An Act to increase the limit of cost of certain public buildings, to authorize the enlargement, extension, remodeling or improvement of certain public buildings, to authorize the erection and completion of public buildings, to authorize the purchase of sites for public buildings, and for other purposes", passed at the first session of the Sixtieth Congress, namely:

* * * * *

Under the provisions and limitations of section thirty-two of said Act, as follows: Vol. 35, p. 545. *Post*, p. 2631.

Point Pleasant, West Virginia, monument, ten thousand dollars. Point Pleasant, W. Va. Monument.

* * * * *

DISTRICT OF COLUMBIA.

District of Columbia.

* * * * *

CONTINGENT EXPENSES.

Contingent expenses.

* * * * *

REIMBURSEMENT OF PHILADELPHIA, BALTIMORE AND WASHINGTON RAILROAD COMPANY: For reimbursement of the Philadelphia, Baltimore and Washington Railroad Company for the cost of maintenance of the Long Bridge from February Twelfth, nineteen hundred and six, to December eighteenth, nineteen hundred and six, six thousand four hundred and eighteen dollars and sixteen cents. Philadelphia, Baltimore and Washington Railroad Company. Care of Long Bridge.

* * * * *

Except as otherwise provided, one-half of the foregoing amounts to meet deficiencies in the appropriations on account of the District of Columbia shall be paid from the revenues of the District of Columbia and one-half from any money in the Treasury not otherwise appropriated. Half from District revenues.

MILITARY ESTABLISHMENT.

Army.

* * * * *

MISCELLANEOUS.

Miscellaneous.

* * * * *

The accounting officers of the Treasury are directed to credit in the accounts of First Lieutenant Edward N. Johnston, Corps of Engineers, the sum of one thousand three hundred and ninety-one dollars and sixty-seven cents now standing against him on the books of the Treasury. Edward N. Johnston. Credit in accounts.

The accounting officers of the Treasury are directed to credit in the accounts of Lieutenant Mark Brooke, Corps of Engineers, the sum of eighty-five dollars now standing against him on the books of the Treasury. Mark Brooke. Credit in accounts.

* * * * *

SEC. 2. That for the payment of the following claims, certified to be due by the several accounting officers of the Treasury Department under appropriations the balances of which have been exhausted or carried to the surplus fund under the provisions of section five of the Act of June twentieth, eighteen hundred and seventy-four, and under appropriations heretofore treated as permanent, being for the service of the fiscal year nineteen hundred and five and prior years, unless otherwise stated, and which have been certified to Congress under section two of the Act of July seventh, eighteen hundred and eighty-four, as fully set forth in House Document Numbered Eight hundred and eighty-seven, reported to Con- Claims certified by accounting officer. Vol. 18, p. 110. Vol. 23, p. 254.

gress at its present session, there is appropriated as follows:

* * * * *

Claims allowed by Auditor for War Department.

CLAIMS ALLOWED BY THE AUDITOR FOR THE WAR DEPARTMENT.

* * * * *

Fortifications.

For contingencies of fortifications, including fieldworks, forty-five dollars.

* * * * *

Approved, May 30, 1908.

May 30, 1908. [H. R. 21897.] [Public, No. 168.] Vol. 35, pp. 520, 540, 543, 544, 545.

CHAP. 228.—An Act To increase the limit of cost of certain public buildings, to authorize the enlargement, extension, remodeling, or improvement of certain public buildings, to authorize the erection and completion of public buildings, to authorize the purchase of sites for public buildings, and for other purposes.

Public buildings, omnibus act. Limit of cost increased.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, * * *

* * * * *

Washington, D. C. Commission on armory for National Guard designated.

SEC. 17. That a commission consisting of the Assistant Secretary of War, the general commanding the militia of the District of Columbia, the officer in charge of public buildings and grounds at Washington, District of Columbia, and the Superintendent of the United States Capitol Building and Grounds, be, and is hereby, created, which shall cause plans and estimates to be prepared for a suitable armory for the National Guard of the District of Columbia, and report the estimated cost thereof to the Congress: *Provided*, That such plans and estimates be prepared under the supervision of the Secretary of the Treasury.

Proviso. Plans, etc.

Appropriation for expenses.

And for the expense of said commission a sum not to exceed two thousand five hundred dollars is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to be expended on vouchers approved by the chairman of said commission.

* * * * *

District of Columbia. Commission designated to investigate United States title to lands, etc.

SEC. 26. That a commission be, and the same is hereby, created, to consist of five members, namely, the Secretary of War, the Attorney-General, the president of the Board of Commissioners of the District of Columbia, the chairman of the Committee on Public Buildings and Grounds of the United States Senate, and the chairman of the Committee on Public Buildings and Grounds of the United States House of Representatives, for the purpose of investigating the title of the United States in and to all lands in the District of Columbia, with a view to protecting such title, filing a map of said lands, and ascertaining whether or not any individual or corporation is, without proper authority, occupying, in

Duties.

whole or in part, any such lands. Said commission shall also investigate and report on any and all transfers of title to such lands by the United States, either by authority of Congress or otherwise, and shall make recommendations as to the future policy of the Government with respect to the sale or retention of any and all such lands, title to which may have been or is now vested in the United States, and pending the report of said commission, unless otherwise directed by Congress, all authorizations heretofore made for the sale of Government land in the District of Columbia, in which conveyances have not been made or contracts entered into, shall be held in abeyance. The commission hereby created shall have authority to send for persons, papers, documents, public and private records, administer oaths, and to conduct such investigation in such manner as said commission may deem best, and shall report the results of such investigation to the Sixtieth Congress, together with its recommendations. And for the expense of said commission a sum not to exceed five thousand dollars is hereby appropriated, out of any money in the Treasury not otherwise appropriated, to be expended on vouchers approved by the chairman of said commission.

Transfers withheld until report made.

Authority.

Appropriation for expenses.

* * * * *

SEC. 28. That the Secretary of War or other officer having charge of the filtration plant and the Government reservation on which it is situated in the District of Columbia be, and he hereby is, authorized and directed to purchase or cause to be taken for public use, by condemnation or otherwise, as an addition to said reservation for the purpose of extending its boundaries any land embraced in square three thousand one hundred and twenty-six, in the city of Washington, District of Columbia, not now owned by the United States or the District of Columbia.

Filtration plant, D. C.

Additional land to be acquired.

That for the purpose of carrying into effect the provisions of this Act the Secretary of War be, and he hereby is, authorized to expend the sum of eight thousand dollars, or as much thereof as may be necessary, out of the amounts heretofore appropriated by Congress for a slow sand filtration plant, and for each and every purpose connected therewith.

Purchase from appropriation for plant.

* * * * *

SEC. 32. That the sum of ten thousand dollars be, and the same is hereby, authorized, out of any money in the Treasury not otherwise appropriated, to be expended under the direction of the Secretary of War, to aid in the erection and completion of a memorial structure at Point Pleasant, West Virginia, to commemorate the battle of the Revolution fought at that point between the colonial troops and Indians October tenth, seventeen hundred and seventy-four: *Provided*, That no part of said appropriation shall be expended until the site and plans for said monument or memorial shall be approved by the

Point Pleasant, W. Va.

Memorial to commemorate battle of Revolution.

Vol. 35, p. 491.

Ante, p. 2629.

Proviso.

Plans, etc.

Secretary of War and the grounds on which said monument or memorial is to be located shall be dedicated to the use of the public and provision is made for opening and maintaining an open highway thereto.

* * * * *

Amendment.

SEC. 38. That Congress reserves the right to alter, amend, or repeal this Act.

Repeal of conflicting acts.

SEC. 39. That all Acts or parts of Acts in conflict herewith are hereby repealed.

Approved, May 30, 1908.

May 30, 1908. [H. R. 17228.] [Public, No. 174.] Vol. 35, p. 554.

CHAP. 234.—An Act To promote the safe transportation in interstate commerce of explosives and other dangerous articles, and to provide penalties for its violation.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall be unlawful to transport, carry, or convey any dynamite, gunpowder, or other explosive between a place in any foreign country and a place within the United States, or a place in any State, Territory, or District of the United States, and a place in any other State, Territory, or District thereof, on any vessel or vehicle of any description operated by a common carrier, which vessel or vehicle is carrying passengers for hire: *Provided*, That it shall be lawful to transport on any such vessel, or vehicle, small arms ammunition in any quantity, and such fusees, torpedoes, rockets, or other signal devices as may be essential to promote safety in operation, and properly packed and marked samples of explosives for laboratory examination, not exceeding a net weight of one-half pound each, and not exceeding twenty samples at one time in a single vessel or vehicle; but such samples shall not be carried in that part of a vessel or vehicle which is intended for the transportation of passengers for hire: *And provided further*, That nothing in this section shall be construed to prevent the transportation of military or naval forces with their accompanying munitions of war on passenger equipment vessels or vehicles.

Explosives, carrying dynamite, etc., on passenger vessels and vehicles prohibited.

Provisos. Exceptions, samples, etc.

Restriction.

Transportation of military and naval munitions of war, etc., allowed.

Regulations. Interstate Commerce Commission to promulgate.

SEC. 2. That within ninety days from the passage of this Act the Interstate Commerce Commission shall formulate regulations for the safe transportation of explosives, and said regulations shall be binding upon all common carriers engaged in interstate commerce which transport explosives by land, and violations of them shall be subject to the penalties hereinafter provided. The Interstate Commerce Commission, on its own motion or upon application made by any interested party, may make changes or modifications of the regulations for the safe transportation of explosives, made desirable by new information or altered conditions, and such changed regulations shall have all the force of the original regulations. The regulations for the safe transportation of explosives referred to in this section shall be in accord with the best

Changes.

Packing, marking, etc.

known practicable means for securing safety in transit, covering the packing, marking, loading, handling while in transit, and the precautions necessary to determine whether the material when offered is in proper condition to transport. The regulations for the safe transportation of explosives shall take effect three months after their formulation and publication by the Interstate Commerce Commission, and shall be in effect until reversed, set aside, or modified.

Effect.

SEC. 3. That it shall be unlawful to transport, carry, or convey liquid nitroglycerine, fulminate in bulk in dry condition, or other like explosive between a place in a foreign country and a place within the United States, or a place in one State, Territory, or District of the United States and a place in any other State, Territory, or District thereof, on any vessel or vehicle of any description operated by a common carrier in the transportation of passengers or articles of commerce by land or water.

Nitroglycerine, etc. Interstate, etc., transportation of, prohibited.

SEC. 4. Every package containing explosives or other dangerous articles when presented to a common carrier for shipment shall have plainly marked on the outside thereof the contents thereof, and it shall be unlawful for any person to deliver, for interstate or foreign transportation, to any common carrier engaged in interstate or foreign commerce by land or water, or to cause to be delivered, or to carry, any explosive, or other dangerous article, under any false or deceptive marking, description, invoice, shipping order, or other declaration, or without informing the agent of such carrier of the true character thereof, at or before the time such delivery or carriage is made.

Marking packages of explosives.

Deceptive marking.

SEC. 5. That every person who knowingly violates, or causes to be violated, any of the foregoing provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished for each offense by a fine not exceeding two thousand dollars, or by imprisonment not exceeding eighteen months, or by both such fine and imprisonment, in the discretion of the court.

Penalty. R. S., sec. 5253, p. 1039, amended.

SEC. 6. That this Act shall take effect immediately, and all Acts or parts of Acts in conflict therewith are hereby repealed, except section forty-four hundred and twenty-two of the Revised Statutes of the United States, which shall remain in full force and effect.

Effect. Repeal. R. S. sec. 4422, p. 857.

Approved, May 30, 1908.

CHAP. 235.—An Act To amend section fifty-four hundred and thirty-eight of the Revised Statutes.

May 30, 1908. [H. R. 19462.] [Public, No. 175.] Vol. 35, p. 555.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section fifty-four hundred and thirty-eight of the Revised Statutes be, and the same is hereby, amended to read as follows:

False claims against the Government. R. S., sec. 5438, p. 1054.

"SEC. 5438. Every person who makes or causes to be made, or presents or causes to be presented, for payment

Presenting false claims.

or approval, to or by any person or officer in the civil, military, or naval service of the United States, any claim upon or against the Government of the United States, or any department or officer thereof, knowing such claim to be false, fictitious, or fraudulent, or who, for the purpose of obtaining or aiding to obtain the payment or approval of such claim, makes, uses, or causes to be made or used, any false bill, receipt, voucher, roll, account, claim, certificate, affidavit, or deposition, knowing the same to contain any fraudulent or fictitious statement or entry, or who enters into any agreement, combination, or conspiracy to defraud the Government of the United States, or any department or officer thereof, by obtaining or aiding to obtain the payment or allowance of any false or fraudulent claim, or who, having charge, possession, custody, or control of any money or other public property used or to be used in the military or naval service, who with intent to defraud the United States or willfully to conceal such money or other property, delivers or causes to be delivered, to any person having authority to receive the same, any amount of such money or other property less than that for which he received a certificate or took a receipt, and every person authorized to make or deliver any certificate, voucher, receipt, or other paper certifying the receipt of arms, ammunition, provisions, clothing, or other property so used or to be used, who makes or delivers the same to any other person without a full knowledge of the truth of the facts stated therein, and with intent to defraud the United States, shall be imprisoned at hard labor for not more than five years, or fined not more than five thousand dollars; and every person who knowingly purchases or receives in pledge for any obligation or indebtedness from any soldier, officer, sailor, or other person called into or employed in the military or naval service any arms, equipments, ammunition, clothes, military stores, or other public property, whether furnished to the soldier under a clothing allowance or otherwise, such soldier, sailor, officer, or other person not having the lawful right to pledge or sell the same, shall be punished by imprisonment for not more than two years and by a fine not exceeding five hundred dollars."

Military and naval property.

Custodians, etc., who deliver, etc., with fraudulent intent.

Penalty.

Persons who purchase, etc., public property with fraudulent intent.

Penalty.

Approved, May 30, 1908.

May 30, 1908. [H. R. 21844.] [Public, No. 176.] Vol. 35, p. 556.

CHAP. 236.—An Act Granting to certain employees of the United States the right to receive from it compensation for injuries sustained in the course of their employment.

Government employees.

Compensation to certain, for injuries sustained during employment.

Character of work specified.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That when, on or after August first, nineteen hundred and eight, any person employed by the United States as an artisan or laborer in any of its manufacturing establishments, arsenals, or navy-yards, or in the construction

of river and harbor or fortification work or in hazardous employment on construction work in the reclamation of arid lands or the management and control of the same, or in hazardous employment under the Isthmian Canal Commission, is injured in the course of such employment, such employee shall be entitled to receive for one year thereafter, unless such employee, in the opinion of the Secretary of Commerce and Labor, be sooner able to resume work, the same pay as if he continued to be employed, such payment to be made under such regulations as the Secretary of Commerce and Labor may prescribe: *Provided*, That no compensation shall be paid under this Act where the injury is due to the negligence or misconduct of the employee injured, nor unless said injury shall continue for more than fifteen days. All questions of negligence or misconduct shall be determined by the Secretary of Commerce and Labor.

Time limit.

Proviso. Restriction.

SEC. 2. That if any artisan or laborer so employed shall die during the said year by reason of such injury received in the course of such employment, leaving a widow, or a child or children under sixteen years of age, or a dependent parent, such widow and child or children and dependent parent shall be entitled to receive, in such portions and under such regulations as the Secretary of Commerce and Labor may prescribe, the same amount, for the remainder of the said year, that said artisan or laborer would be entitled to receive as pay if such employee were alive and continued to be employed: *Provided*, That if the widow shall die at any time during the said year her portion of said amount shall be added to the amount to be paid to the remaining beneficiaries under the provisions of this section, if there be any.

Compensation to widow, etc.

Regulations.

Proviso. Remaining beneficiaries to receive deceased widow's portion.

SEC. 3. That whenever an accident occurs to any employee embraced within the terms of the first section of this Act, and which results in death or a probable incapacity for work, it shall be the duty of the official superior of such employee to at once report such accident and the injury resulting therefrom to the head of his Bureau or independent office, and his report shall be immediately communicated through regular official channels to the Secretary of Commerce and Labor. Such report shall state, first, the time, cause, and nature of the accident and injury and the probable duration of the injury resulting therefrom; second, whether the accident arose out of or in the course of the injured person's employment; third, whether the accident was due to negligence or misconduct on the part of the employee injured; fourth, any other matters required by such rules and regulations as the Secretary of Commerce and Labor may prescribe. The head of each Department or independent office shall have power, however, to charge a special official with the duty of making such reports.

Reports of injuries.

Character of reports.

SEC. 4. That in the case of any accident which shall result in death, the persons entitled to compensation under

Affidavit filed in case of death.

Time limit.

this Act or their legal representatives shall, within ninety days after such death, file with the Secretary of Commerce and Labor an affidavit setting forth their relationship to the deceased and the ground of their claim for compensation under the provisions of this Act. This shall be accompanied by the certificate of the attending physician setting forth the fact and cause of death, or the nonproduction of the certificate shall be satisfactorily accounted for. In the case of incapacity for work lasting more than fifteen days, the injured party desiring to take the benefit of this Act shall, within a reasonable period after the expiration of such time, file with his official superior, to be forwarded through regular official channels to the Secretary of Commerce and Labor, an affidavit setting forth the grounds of his claim for compensation, to be accompanied by a certificate of the attending physician as to the cause and nature of the injury and probable duration of the incapacity, or the nonproduction of the certificate shall be satisfactorily accounted for. If the Secretary of Commerce and Labor shall find from the report and affidavit or other evidence produced by the claimant or his or her legal representatives, or from such additional investigation as the Secretary of Commerce and Labor may direct, that a claim for compensation is established under this Act, the compensation to be paid shall be determined as provided under this Act and approved for payment by the Secretary of Commerce and Labor.

Physician's certificate.

Affidavit in case of injury.

Contents of affidavits, etc.

Determining compensation.

Medical examination.

SEC. 5. That the employee shall, whenever and as often as required by the Secretary of Commerce and Labor, at least once in six months, submit to medical examination, to be provided and paid for under the direction of the Secretary, and if such employee refuses to submit to or obstructs such examination his or her right to compensation shall be lost for the period covered by the continuance of such refusal or obstruction.

Refusal to be examined.

Payments to beneficiaries, etc.

SEC. 6. That payments under this Act are only to be made to the beneficiaries or their legal representatives other than assignees, and shall not be subject to the claims of creditors.

Contracts exempting from liability void.

SEC. 7. That the United States shall not exempt itself from liability under this Act by any contract, agreement, rule, or regulation, and any such contract, agreement, rule, or regulation shall be pro tanto void.

Repeal.

SEC. 8. That all Acts or parts of Acts in conflict herewith or providing a different scale of compensation or otherwise regulating its payments are hereby repealed.

Approved, May 30, 1908.

APPENDIX P P P.

ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

OFFICE MISSISSIPPI RIVER COMMISSION,
St. Louis, Mo., June 30, 1908.

SIR: The Mississippi River Commission has the honor to submit this its annual report for the year ending June 30, 1908.

The act of June 28, 1879, by which the Commission was created, defined its duties as follows:

> To direct and complete such surveys of said river, between the Head of the Passes near its mouth to its headwaters as may now be in progress, and to make such additional surveys, examinations, and investigation, topographical, hydrographical, and hydrometrical, of said river and its tributaries, as may be deemed necessary by said Commission to carry out the objects of this act. * * To take into consideration and mature such plan or plans and estimates as will correct, permanently locate, and deepen the channel and protect the banks of the Mississippi River; improve and give safety and ease to the navigation thereof; prevent destructive floods; promote and facilitate commerce, trade, and the postal service; * * *

Under the authority of this act and subsequent laws relating to the subject surveys and observations have been carried on and works of improvement under the authority and direction of laws making appropriations for that purpose have been undertaken and executed. The original project contemplated the permanent location and deepening of the channel by the contraction of the low-water width where necessary, the protection of the banks against caving, and the control of the flood waters by means of levees. The works designed primarily for the rectification and improvement of the channel have been confined to the Plum Point reach, 147 to 186 miles, and Lake Providence reach, 517 to 552 miles below Cairo. These reaches were selected because here the shifting sand bars and deficient depths were the most pronounced and the low-water navigation was the most difficult. Highly beneficial results were obtained in the improvement of the channel depths in those reaches, and the work done in them confirmed the soundness of the theory upon which it was based, but also demonstrated that the permanent improvement of the channel by contraction and revetment works would necessarily consume a long period of time, while the pressing needs of commerce called for immediate relief. Fortunately the development in hydraulic dredging machinery had reached such a stage as to hold out the hope that an immediate and economical solution of the problem of temporarily deepening the channel for navigation purposes might be found in the opening and maintenance of channels across the obstructing bars at each low-water season by means of dredging, with a view to maintaining a navigable channel 250 feet in width and not less than 9 feet

in depth. After studies and experiments extending over several years this method of temporary improvement of the low-water channel was adopted, and has been applied with success. The history of the work from the beginning, and of the experiences which led to the adoption of this method and the reasons therefor, are fully detailed in former reports.

In order to test the practicability of securing and maintaining a navigable channel below Cairo 14 feet in depth at low water, experimental dredging with this object was authorized in November, 1906, and was carried on to a limited extent during the low-water season of 1907 with encouraging results.

One of the important items in the operations of the Commission is the general repair and construction of levees, which was first authorized without qualifying restrictions by the act of September 19, 1890, and since that date about one-half of the appropriations made by Congress have been devoted to that purpose.

The project under which the work of the Commission has been conducted for several years past and which is proposed for the year to come may be stated in general terms as follows:

1. Continuation of surveys; preparation and publication of maps; maintenance of gauges; the recording, tabulation, and publication of gauge readings; the taking and recording of discharge measurements at high and low stages of the Mississippi River and its tributaries, and other observations.
2. The building, extension, and repair of levees.
3. The building, maintenance, and operation of dredge boats.
4. The repair and extension of existing works for the improvement of the channel, the preservation of harbors, the prevention of cut-offs, and the security of levees.
5. The maintenance of a low-water channel between the Mississippi, Red, and Atchafalaya rivers.

Other miscellaneous details incident to the execution of the general project, all of which are treated in the following pages.

APPROPRIATIONS AND ALLOTMENTS.

By the river and harbor act approved March 2, 1907, the sum of $3,000,000 was appropriated for improving the Mississippi River from the Head of Passes to the mouth of the Ohio River, including salaries, clerical, official, traveling, and miscellaneous expenses of the Mississippi River Commission. Two million nine hundred and twenty-one thousand dollars of the amount thus appropriated was allotted, on recommendation of the Mississippi River Commission, as shown on pages 2607–2608 of the Report of the Chief of Engineers for 1907. The remaining $79,000 was allotted during the year, on recommendation of the Commission, as follows:

Mississippi River Commission	$7,000
Surveys, gauges, and observations	10,000
Dredges and dredging	60,000
Plant, care and repair of, third district	2,000
	79,000

This river and harbor act, approved March 2, 1907, also authorized the letting of contracts to the extent of $6,000,000, in addition to

the amount appropriated by the act, this sum to be used in prosecuting the improvement for not less than three years, beginning July 1, 1908.

By the sundry civil act approved May 27, 1908, $2,000,000 of the above $6,000,000 was appropriated for continuing improvement of Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission. All but $10,000 of the amount thus appropriated was allotted, on the recommendation of the Commission, as follows:

Mississippi River Commission	$22,000	
Surveys, gauges, and observations	50,000	
Dredges and dredging	334,000	
		$406,000
FIRST AND SECOND DISTRICTS.		
Surveys	5,000	
Upper St. Francis levee district	45,000	
Lower St. Francis levee district	90,000	
White River levee district	50,000	
Plum Point reach	80,000	
For bank revetment at Walnut Bend, Ark., for protection of levee and the improvement of the channel	81,500	
For bank revetment at Old Town Bend, Ark., for protection of levee and the improvement of the channel	50,000	
Plant	90,000	
Caruthersville, Mo	3,000	
Hopefield Bend (preservation of works at)	10,000	
		504,500
THIRD DISTRICT.		
Surveys	7,500	
Lower Yazoo levee district	150,000	
Upper Tensas levee district	65,000	
Stone	40,000	
General repairs to existing works	30,000	
Plant	35,000	
Greenville, Miss	40,000	
For bank revetment at Lake Bolivar, Mississippi, for protection of levee and the improvement of the channel	30,000	
For bank revetment at Panther Forest, Ark., for protection of levee and the improvement of the channel	70,000	
For bank revetment at Vaucluse, Ark., for protection of levee and the improvement of the channel	70,000	
		537,500
FOURTH DISTRICT.		
Surveys, gauges, and observations	5,000	
Lower Tensas levee district	100,000	
Barataria levee district	40,000	
Pontchartrain levee district	75,000	
Lake Borgne levee district	40,000	
For bank revetment at Bondurant Chute, Louisiana, for protection of levee and the improvement of the channel	2,000	
Plant	55,000	
Natchez and Vidalia harbors, Mississippi, and Louisiana	75,000	
New Orleans Harbor, Louisiana	150,000	
		542,000
Unallotted balance		10,000
Total		2,000,000

The following reallotments of funds have been made during the year:

From Old Town Bend, $18,000; Walnut Bend, $12,000; Upper and Lower St. Francis levee districts, White River levee district, Hopefield Bend, $5,000 each; Chute of Island No. 26, $2,000, to plant first and second districts	$52,000.00
From Old Town Bend to Hopefield Bend	12,000.00
From Walnut Bend, $6,000; Old Town Bend, $12,000, to Chute of Island No. 26 (Abatis dikes)	18,000.00
From levees White River district to plant, first and second districts	40,000.00
From Longwood revetment to repairs to plant, third district	10,000.00
From Longwood, Miss., revetment to plant, third district	15,000.00
From Longwood, Miss., revetment to stone, third district	3,043.07
From balance of allotments to be allotted in the discretion of the president of the commission to plant, third district	4,000.00

Nine thousand one hundred dollars was allotted by the Chief of Engineers for the fiscal year ending June 30, 1908, from the permanent indefinite appropriation made by act of August 11, 1888, as amended by act of June 13, 1902, for gauging the waters of the Mississippi River and its tributaries, which is applied to the maintenance of certain river gauges.

Details of the expenditures of the various allotments are appended hereto.

MISSISSIPPI RIVER COMMISSION.

During the year the membership of the Commission was changed by the appointment of Col. Wm. H. Bixby, Corps of Engineers, U. S. Army, as member and president, vice Col. Clinton B. Sears, Corps of Engineers, U. S. Army, relieved, effective March 14, 1908.

The only change in the personnel of officers in charge of works under the Commission was in the third district, Where Capt. Clarke S. Smith, Corps of Engineers, U. S. Army, relieved Capt. Geo. M. Hoffman, Corps of Engineers, U. S. Army, of his duties as officer in charge of that district on December 15, 1907.

Four sessions of the Commission were held during the year, as follows: The one hundred and third, on board the steamer *Mississippi* during the low-water inspection of the river, November 18–26, 1907; the one hundred and fourth, at the offices of the Commission in St. Louis, Mo., on February 24, 1908; the one hundred and fifth, on board the steamer *Mississippi* during the high-water inspection of the river, April 11–20, 1908; and the one hundred and sixth, at the offices of the Commission in St. Louis, June 25 and 26, 1908.

At all of these meetings public hearings were given to the representatives of the navigation, commercial, and other interests of the river.

SURVEYS AND MAPS.

Surveys.—The fieldwork of the general survey of the Mississippi River from Head of the Passes to the headwaters was completed in July, 1904, and the reduction and platting of the field notes of the last two field seasons have been partly completed. The extent and character of the general survey is given in the annual report of the Commission for 1905.

The fieldwork of the low-water survey from Cairo to the mouth of the Arkansas River was completed in November, 1904, and the

reduction and platting of the field notes were completed in the office in 1906. The cross sections of this survey are now being prepared for comparison with those of the earlier general survey of this stretch, with a view to determining the changes that have taken place in the river bed.

When the Mississippi River Commission in 1900 reran the line of precise levels betwen Baton Rouge, La., and Fort Adams, Miss., a discrepancy of about 1 foot was found to exist at the latter point between the earlier and later levels. This releveling has since been extended northward to the mouth of White River, Arkansas, where it was closed on account of high water in January, 1907. The fieldwork has not since been resumed, as the personnel of the leveling party has, during the past season, been engaged on work under the Board on Examination and Survey of the Mississippi River. The final office computations have been completed and the results tabulated as far as the fieldwork extends. This releveling now extends from the jetties to the mouth of White River, a distance by river of about 676 miles, not including the side line from Biloxi to New Orleans of 87 miles. It is proposed to carry this work northward next season.

Many of the permanent marks of the general survey of the river having been destroyed in the twenty years that have elapsed since they were set, a party was put in the field in the fall of 1905 to restore the system. The work was begun at Cairo and completed to a point about 4 miles above Helena, Ark., a distance by river of about 302 miles, during that and the following season. Field work was resumed at this point above Helena early in October, 1907, and by the middle of February, 1908, had been carried to a point about 35 miles below Greenville, Miss., a distance by river of about 211 miles, where the work was suspended on account of approaching high water. It is proposed to continue this work next season.

Maps.—Nos. 142 to 145, scale inch to the mile, extending this series to 1½ miles above Grand Rapids, Minn., 1,216 miles above Cairo, and detail charts Nos. 234 to 242, scale 1 to 10,000, extending this series to 2 miles below Split Hand Creek, 1,186 miles above Cairo, were published during the year.

New editions of maps Nos. 13, 15, 16, 17, 19, and 21 to 25, inch to the mile, and index sheet No. I, series below Cairo, map of the Lower Alluvial Valley, in 8 sheets, and map of the St. Francis Basin, in 2 sheets, were printed during the year.

Charts Nos. 243 to 259, drawn to scale of 1 to 5,000, extending from near Split Hand Creek to Lake Winnibigoshish, Minn., 1,294 miles above Cairo, have been prepared in part for the publisher.

Map No. 145, inch-to-the-mile series, has been completed, ready for the publisher, and map No. 146 has been prepared in part.

Nearly all of the office force in the drawing division have been engaged on work for the Board on Examination and Survey of the Mississippi River, and in consequence the reduction of field notes and mapping above Brainerd, Minn., has been practically suspended for the time.

Gauges.—The regular gauges, high-water gauges and tide gauges, have been maintained during the year, periodic inspections being made for the purpose of making needed repairs to gauges and bulle-

tins and determining errors in the gauges, if any. During the high water of March and April, 1908, reports were received from the high-water gauge observers and a profile of the high water has been prepared from Cairo to the Head of Passes.

Discharge observations.—During the high-water season, from February to June, 1908, discharges were measured at Helena, Ark.; Chicot, Ark.; Vicksburg, Miss.; Red River Landing, La., and Thebes, Ill., on the Mississippi River; at St. Charles, Mo., on the Missouri River, and at Little Rock, Ark., on the Arkansas; Simmesport on the Atchafalaya, and Jonesville, La., on the Black River. At some of these stations, after a series of discharge measurements had been completed, another rise set in, and where this materially exceeded the first rise a second series of discharge measurements were made.

For further details concerning the foregoing, attention is invited to the report of Capt. G. R. Lukesh, Corps of Engineers, U. S. Army, secretary, appended hereto.

DREDGES AND DREDGING.

Project.—A statement of the project under which the hydraulic dredges of the Commission have been built, maintained, and operated will be found on page 8 of the Annual Report for 1904. The success attained in dredging and the importance of the unfailing maintenance of the channel is discussed in the report of 1905, pages 9 and 10, and the recommendation therein made for ample funds to carry on this work continuously as required is again renewed.

The new dredge *B. M. Harrod* was received from the contractors early in August, 1907, in time for testing under actual dredging conditions during the low-water season; some minor alterations and adjustments of machinery have since been made by the contractor, and the dredge was finally accepted by the Government, May 19, 1908.

Season's operations.—During the low-water season of 1907, five dredges, the *Beta*, *Iota*, *Kappa*, *Henry Flad*, and *B. M. Harrod*, were operated on various bar crossings from Linda, 82 miles below Cairo, to Daisy, 252 miles below Cairo. Two other dredges, the *Epsilon* and *Zeta*, were in commission during the latter part of the season, but no work was required of them.

The project channel depth of not less than 9 feet, with a width of 250 feet, was maintained throughout the year.

The lowest stage of the river during the low-water season of 1907 was only moderately low; the average difference of the various gauge stations from Cairo to Red River Landing was 10.4 feet above the previous lowest stage, and but little dredging was required to maintain the 9-foot project.

In addition to the regular project work of maintaining a channel not less than 9 feet deep and 250 feet wide some experimental dredging was done at three crossings in order to test the feasibility of maintaining a navigable channel not less than 14 feet in depth at all stages. These crossings were Linda, Island 35, and Corona, respectively, 82, 193, and 204 miles below Cairo. At Linda and Island 35 the required depth of 14 feet was easily maintained; at Corona, however, some difficulty was experienced, but it is probable that this difficulty could have been avoided had a different location for the cut been chosen.

All these dredges had been returned to the fleet by December 28, 1907, and laid up in winter quarters.

For further details concerning the dredges and dredging, attention is invited to the report of Capt. G. R. Lukesh, Corps of Engineers, U. S. Army, secretary, appended hereto.

CHANNEL WORK, BANK PROTECTION, AND HARBOR IMPROVEMENTS IN THE SEVERAL DISTRICTS.

First district, from Cape Girardeau, Mo., to the foot of Island 40 (270 miles).—Headquarters: Custom-house, Memphis, Tenn. District officer, Capt. William D. Connor, Corps of Engineers.

Construction works for channel improvement, protection of caving banks, and harbor work in this district are located at Columbus and Hickman, Ky., New Madrid and Caruthersville, Mo., and Plum Point reach, together with certain isolated works consisting of low-water channel dikes at different points throughout this district.

Columbus, Ky., 21 miles below Cairo, left bank.—The work at this point was done in 1889 and 1890 and consists of five submerged dikes, protecting about 2,200 feet of harbor front. No repairs have been made since and no work other than possible minor repairs is projected for the coming season.

Hickman, Ky., 36 miles below Cario, left bank.—The work at this point consists of 1,450 feet of effective continuous revetment placed in 1889, 1892, and 1894 to prevent caving along the lower portion of the town. Slight repairs were made in 1900 on account of injury to the revetment from local drainage. The work is now in good condition, and nothing additional is at present contemplated.

New Madrid, Mo., 71 miles below Cairo, right bank.—This work consists of bank revetment extending along the river front of the town, of continuous fascine mattresses 260 feet wide below low water, with riprap paving on the graded bank above low water. Nine hundred feet of revetment were constructed in 1893 and afterwards extended as follows: 700 feet in 1894, 500 in 1896, 1,573 in 1898, and 1,000 in 1900. The present effective revetment is 4,450 feet long and is in good condition. For the present no additional work will be required at this point.

Caruthersville, Mo., 110 miles below Cairo, right bank.—This work consists of one spur dike and a continuous revetment for the protection of the caving bank in front of the town. No repair work was done at this point during the past year, as the plant was all engaged on other work. A small amount of repair work will have to be done during the coming year. There is now about 2,400 feet of effective revetment at this point.

Plum Point reach, 147 to 186 miles below Cairo.—The works in this reach comprise about 67,400 feet of revetment for the protection of caving banks, the partial closure of the chutes behind Elmot bar and Island 30 with a brush and stone dam, the closure of Osceola and Bullerton chutes with pile dikes, and a levee along the left bank to confine the flood waters more nearly to the low-water channel. The object of all these works was to increase the navigable depth at low water in a reach of river which had been noted for years for its obstructing sand bars. As a result the banks have remained practi-

cally fixed within the prescribed limits, and the navigable depth at low water has been increased to such an extent that little or no difficulty has been experienced in navigating this reach since the works approached completion. At no time since the works were well under way has navigable depth reached as low a point as it did nearly every low-water season prior to the construction of the rectification works.

There was a considerable amount of small repair work in this reach that would have been done during the past season if plant for this work had been available, but, as it was, the repair work was limited to four stone and brush dikes that were built across gullies that had been washed in the top of the bank behind the pavement. During the coming year it is proposed to thoroughly repair this revetment.

Abatis dikes.—These dikes are used for the purpose of closing secondary chutes and for contracting the low-water channel by building up sand bars. No work of this kind was done in the first district during the past season, but the bars at Cherokee Crossing and at Ashport bar that were built up by use of these dikes, still remain in position.

For further details concerning the work in the first district see report of Captain Connor, appended hereto.

Second district, foot of Island 40 to White River (173 miles).—Headquarters: Custom-house, Memphis, Tenn. District officer, Capt. Wm. D. Connor, Corps of Engineers.

This district includes the protection of caving banks and harbor work at Hopefield Bend, Ark., Memphis, Tenn., and at Helena, Walnut Bend, and Old Town, Ark., and also the dredging of Wolf River, Tenn.

Hopefield Bend, Ark., 227 miles below Cairo, right bank.—This revetment, originally 16,600 feet long, was constructed at various times between 1882 and 1889, and has been repaired at various times. By 1906 this revetment had been replaced by 14,800 feet of standard revetment, and the paving had been carried to the top of the bank over practically all of this length. During the high water of 1907 the bank behind the Rock Island Railway incline began to cave very rapidly and by the end of the high water a pocket about 875 feet by 200 feet has been eroded. This erosion did not extend below low water over a great portion of the pocket, and thus made the repair work very difficult because the water was too shallow to permit satisfactory pocket mat work, and the wide, flat bank, exposed when the water was at six feet on the Memphis gauge, had to be paved with stone. This pocket was completely protected and the high waters of the present season do not seem to have affected it materially.

There are a good many places along this revetment that need repair. These are practically all of them just above the low-water line and can only be reached when the river is at a very low stage. It is proposed to repair these during the coming season if the stage of water permits.

Wolf River, 230 miles below Cairo, left bank.—The part of this stream under improvement is a part of Memphis Harbor, and the improvement consists of dredging for the purpose of maintaining a 5-foot navigable channel during the low-water season from its mouth 2½ miles upstream to the county bridge. During the past year the

work in this river was confined to dredging over the bar at the mouth. This bar is largely composed of soft mud and sawdust, and the channel excavated by the dipper dredge *Wolf* is costly to excavate and difficult to maintain. It is proposed to execute further dredging in this river with one of the large dredges of the Commission. The Rock Island Railway Company has abandoned its incline in Wolf River and is now operating one on the main bank of the Mississippi, thus removing one of the chief reasons for dredging. No work is contemplated at this point during the coming year.

Memphis Harbor, 230 to 232 miles below Cairo, left bank.—The work along the Memphis front embraces the protection of 14,800 linear feet of bank by means of spur dikes and continuous revetment, the upper portion of which is covered by a sand bar which encroaches somewhat upon the levee front of the city. The area of this bar between Wolf River and the levee front is about 100 acres at low water, of which 12 acres is above water at the 25-foot stage. The cross sections over the lower end of the bar show no marked change in its location or size. The revetment along the Memphis front is in good condition. No repairs were made during the past season, and none are contemplated for the coming season. Its present effective length is 9,900 feet.

Walnut Bend, Arkansas, 281 miles below Cairo, right bank.—During the past few years the bank along this bend has been caving with great rapidity and threatens to cut into the St. Francis River at this point. There are two objections to allowing this cut-off to take place. The first objection is that such a cut-off would raise the low-water level of the St. Francis River at this point from 8 to 10 feet, thus inundating a great deal of land that is normally under cultivation when the Mississippi River is within its banks. The second objection is that such a cut-off would preclude the possibility of extending the Lower St. Francis levee downstream across Hardins Point. This extension is a part of the contemplated project of the Lower St. Francis Levee Board, and would lower the backwater effect over a very considerable territory behind what is now the lower end of the Lower St. Francis levee system (mile 283 R). A survey of the St. Francis River showed that a levee system along the left bank of this river, to protect against the backwater from the Mississippi, would cost considerably more than half a million dollars, and since the bank could be protected for less than one-half of this sum by means of standard revetment this idea of this back levee was abandoned. The efficiency of abatis dikes as bar builders suggested their use at this point to build a bar down into the caving bend, and thus stop the caving. (For details of abatis dike construction, see Report of Chief of Engineers, 1899, p. 3536, Pl. 13.) A project was submitted providing for two dikes of a total length of 4,000 feet, to be built in the season of 1906 at a cost of $25,000, and two more dikes, to be built in the season of 1907, provided that the results obtained from the first two dikes warranted a continuation of this part of the project. In case the two dikes built in 1906 did not build the bar as rapidly as expected, there still remained time in the season of 1907 to revet this caving bend. The part of the project for 1906 was carried out and two dikes were built 970 feet apart. The upper dike was 1,454 feet long and the lower dike 1,755 feet long. A very considerable bar has

been built up in the neighborhood of these dikes, and the effect of these dikes extends about 1 mile below the lowest dike. During the past year 1,800 feet of bank revetment was built at this point under exceptionally difficult circumstances, described in the report of the district officer. This length of revetment does not completely protect the levee, and it is proposed to extend the revetment about 2,000 feet during the coming year. The form of the bar opposite this bend was such that it was determined to attempt to draw the main river across the same through a channel dredged in the bar. For this purpose two of the large dredges will be put to work. These dredges will cut a channel across the bar on a falling high water, and it is hoped that a material part of the flow may be made to follow this route. If this experiment is successful, little or no bank protection will be needed along the present main bank. If it is not successful, the bank revetment will be extended in accordance with the previous plan.

Helena, Ark., 306 miles below Cairo, right bank.—The revetment work at this place consists of the protection of 4,900 linear feet of river bank in front of the city, of which 3,500 feet is continuous revetment and 1,400 feet is dike work. There was no change in the bank line along this front and the revetment seems to be intact. To guard against this levee caving away a cross levee has been built below the threatened part, connecting the main White River levee with the high ground to the west just south of the city of Helena, and a similar line above the threatened part will be constructed by the local board for the protection of the city of Helena.

Old Town, Ark., 324 miles below Cairo, right bank.—The bank in this bend has been caving slowly for a long time and had finally cut in so close to the levee that either the bank must be protected or a loop must be built in the levee along the caving bend. A survey was made to show the cost of such a loop and, owing to a lake immediately in the rear of the present levee, the cost of this loop was estimated at $370,000. The bank could be held by standard revetment for less than half of this amount and, since this bank protection would not only obviate the necessity for the costly loop but would serve as an improvement to the channel, it was decided to protect the bank. For similar reasons to those set forth in regard to Walnut Bend it was decided to construct two abatis dikes in the upper part of the bend in the season of 1906, with the hope that they would build a bar down into the bend and protect it from further caving. The conditions at this point were very unfavorable for the use of the abatis dikes, but it was considered justifiable to try them, since the estimate for the abatis dikes was only $18,000 and the estimate for revetting this bend with the standard revetment was about $170,000 and even in case the abatis dikes did not give the desired results they would still protect the upper end of any revetment that would be put in later. Two abatis dikes were constructed in the upper part of the bend 1,370 feet apart. The upper dike was 900 feet long and the lower one 1,260 feet long, and the total cost was $13,383.19. A survey in March of 1907 showed that although a bar had been built around these dikes that the effect in the bend below was not sufficient to warrant building further dikes in the season of 1907, and the project for the revetment of this bend was submitted and approved. During the past season 3,615 feet of revetment was built at this point

and the bank was paved to a suitable height. During the coming season it is proposed to extend the revetment about 1,500 feet downstream and make any repairs that may be necessary after the present high water.

For further details concerning the work in the second district, see report of Captain Connor, appended hereto.

Third district, from White River to Warrenton, Miss. (214 miles).—Headquarters: Vicksburg, Miss. District officer, Capt. G. M. Hoffman from beginning of year to December 15, 1907; Capt. Clarke S. Smith after that date.

This district includes the works of improvement on the Mississippi River at Lake Bolivar front, Ashbrook Neck, Greenville Harbor, Longwood, and Fitler Bend, Mississippi; Louisiana Bend, Lake Providence revetment and reach, Delta Point, and Reid-Bedford Bend, Louisiana; and at Redfork, Ark., on the Arkansas River. Operations of the past year included repairs to the revetments at Lake Bolivar front, Greenville Harbor, and Lake Providence, and the construction of revetment at Fitler Bend, Mississippi, and at Redfork, Ark.

REVETMENT WORK.

Lake Bolivar front, 417 miles below Cairo, left bank.—The work at this point consists of revetment, begun in 1888–1889, to hold the caving bank and prevent the destruction of a levee across the head of Lake Bolivar, which would have necessitated the building of a long and very expensive loop back of the lake. Repairs have been made at different times to the upper bank paving; in 1905–6, 2,134 feet of reenforcing mattress was placed, in 1906–7 repairs of two sections of bank paving were made and a pocket mat placed, and during the past season operations consisted of placing about 1,250 feet of fascine mattress reenforcing the upper end from about 125 feet below the head of the 1905–6 work to a point at station 3+50; several connecting mats of various sizes; grading and paving the banks from stations 3 to 21, and minor repairs to the original work. The effective revetment is 3,150 feet long; the subaqueous mattress for 794 feet is of the old woven type and for about 2,968 feet is of the old type reenforced by the fascine type.

Ashbrook Neck, 446 miles below Cairo, left bank.—The work here consists of 10,100 feet of revetment built to prevent a cut-off which would have disturbed the regimen of the river for a long distance above and below and brought disaster to towns, levees, and other works along the river bank. Repairs have been made to the upper bank paving from time to time and the original mattress has been reenforced where showing signs of weakness. In 1906–7 one large and one small pocket were repaired and the old woven mattress reenforced for a length of 1,200 feet by a fascine mattress. There still remains 1,000 feet of the old work not reenforced. Of the balance, 8,600 feet is reenforced with standard fascine mattress, and 500 feet is fascine mattress extension.

The entire work appears to be in good condition.

Greenville Harbor, 478 miles below Cario, left bank.—The town and harbor of Greenville and the levee along its front (which protects the Yazoo Basin from overflow), are protected by a bank revet-

ment having an effective length of 12,500 feet, of which 1,400 feet is of old type woven mattress, 10,700 feet is of such type reenforced with fascine mattress, and 400 feet is original fascine mattress. During the twelve years from 1882 to 1894 the bank at the Greenville Bend receded a distance of 4,000 feet. This work was begun in 1887 when 10 submerged dikes were placed. The plan was changed to continuous revetment in 1891, and since the completion of the work it has been effective in maintaining the bank line. Repairs have been made from time to time. About 600 feet of bank was protected in 1906—7, and during the past season a channel mat about 400 feet long with connecting mats to the upper bank paving was placed; three connecting mats were constructed between dikes, and exposed points which had been subjected to scour were riprapped.

This revetment has done excellent work and it may be found necessary to reenforce it to a small extent next season.

Longwood, Miss., 500 miles below Cairo, left bank.—Bank revetment was placed in the rapidly caving bend here in 1904–5 to prevent the destruction of a large levee, comparative study having shown that a loop around the threatened section would have been far more expensive. The effective length of the revetment is 4,200 feet, all of the standard fascine type. Although the extension of this revetment 1,000 feet downstream was provided for in 1905, it has not been found necessary, and from the improved conditions in the bend it is probable that further work here can be postponed indefinitely.

Lake Providence reach, 517 to 552 miles below Cairo, right bank.—This section of the river was selected by the Commission soon after its formation for improvement of the low-water channel by means of contraction works and revetment of caving banks. Though marked deepening of shallow crossings resulted, the work was finally discontinued upon the introduction of dredging as means of making low-water channels across the bars. Most of the structures which were comparatively weak have been destroyed, but a much improved low-water channel still remains. In later years active revetment work was resumed at Louisiana Bend and at Lake Providence, but with special objects in view.

Louisiana Bend, 522 miles below Cairo, right bank.—The revetment in this bend was originally part of the systematic improvement of Lake Providence reach. Work was begun in 1889 and was continued from time to time as funds were available until 1897. No extension or repair of this work has been made since then. The original work was 15,820 feet long, of which about 4,000 feet at the lower end has been destroyed and more than half of the remaining 11,820 feet is covered by a bar at the upper end.

Lake Providence, 540 miles below Cairo, right bank.—The bank revetment here protects the town of Lake Providence and the important levee between the river and the lake. It has an effective length of 12,600 feet, of which 1,200 feet is unreenforced old type woven mattress, 1,700 feet is such type reenforced with fascine mattress, 5,000 feet is fascine mattress reenforced with fascine mattress, and 4,700 feet is original fascine mattress. During the season 1906–7 a mattress 600 feet long was sunk to cover defects caused by high water of the previous season and a reenforcing mattress was begun, which had to be sunk before it was completed on account of

a rapid rise in the river. During the past season the uncompleted repairs of the previous season were finished, a mattress about 860 feet long was placed, and repairs made to the upper bank grading and paving.

Fitler Bend, 550 miles below Cairo, left bank.—An allotment made in August, 1906, provided for revetment in this bend to protect the levee from destruction by caving of the bank, otherwise a new levee would soon have been required at such great cost as to be almost impracticable of accomplishment. No work was done in 1906–7 because of lack of plant and outfit. The work last season consisted of the placing of two channel mats and seven connecting mats, protecting about 2,000 feet of bank, the greater portion of which was graded and paved. Foot mats were also constructed along the entire work to make a proper connection between the upper bank and the subaqueous work.

Delta Point, 598 miles below Cairo, right bank.—The object of this work is to hold the point opposite Vicksburg and prevent further recession of the channel downstream away from the harbor, and thus aid in the improvement of Vicksburg Harbor. It has an effective length of 5,900 feet, of which 4,600 feet is of woven mattress, 600 feet of such type reenforced with fascine mattress, and 700 feet is of original fascine mattress. No work has been done since 1899 and none is contemplated for the coming season, aside from some minor repairs to the upper bank.

Reid-Bedford Bend, 603 miles below Cairo, right bank.—An allotment made in August, 1906, provided for revetment in this bend to protect a long line of important levee from destruction by caving of the bank. This bend of the river is very unfavorable either for levee or revetment work. It has a sloughing bank, where large sections settle slowly and slide out; the adjacent land is low and swampy, and the current attains a high velocity in the deep water close to the bank. Each of the numerous sections of abandoned levees has its borrow pit, from which the impounded water sipes through the bank, assisting in its destruction.

Mattresses were placed during 1906–7 covering about 2,000 feet of bank, but owing to the high water no upper bank paving was possible. The work contemplated last season was of such magnitude that the short working season and lack of sufficient plant made its undertaking impracticable. Extensive repair work is needed here this season, and it is intended to undertake several thousand feet of revetment work.

Red Fork, Arkansas River.—Under project of July, 1907, a loop was constructed at Red Fork to replace a section of the controlling levee threatened by the caving of the bank, and under project of December, 1907, bank protection at this point was authorized for the protection of the levee in order to avoid the construction of a long, expensive loop around Lake Belcoe. The levee constructed this season comprises about 122,000 cubic yards, and about 600 feet of bank protection work have been placed.

Further details of the work in this district may be found in the report of Capt. Clarke S. Smith, hereto appended.

Fourth district, Warrenton, Miss., to Head of Passes, 607–1,060 miles below Cairo.—Headquarters: 1539 Louisiana avenue, New

Orleans, La. District officer, Maj. J. F. McIndoe, Corps of Engineers, U. S. Army.

The works include bank protection in Bondurant Chute, bank protection in Kempe Bend, improvement of harbors at Natchez and Vidalia, rectification of Red and Atchafalaya rivers, and improvement of the harbor at New Orleans, La.

Bondurant Chute, 644 miles below Cairo, right bank.—This work was undertaken in 1899 in order to prevent the destruction of the levee lying betwen the upper end of Lake Bruen and the bank of the river, no other location of the levee line being practicable in the immediate vicinity, and its abandonment involving the construction of a loop several miles long around and behind the lake. In addition to the cost of constructing this new line of levee to replace the old one, the abandonment of the latter would result in the exposure to overflow of a large amount of cultivated land.

The revetment consists of mattresses, constructed of lumber and willow brush, and a few experimental ones built entirely of lumber, for the submerged portion, with an upper bank pavement of concrete and rock. The revetment has now a total length of 3,440 linear feet and is in good condition.

During the past season repairs were made to the upper bank pavement, and 60,123 square feet of the upper bank at the lower end of the revetment was graded and paved. The work has been successful in protecting the levee.

Kempe Bend, 658 miles below Cairo, right bank.—The object of this work has been to prevent further erosion of the bank line in Kempe Bend, which has already destroyed several lines of levee and nearly reached a final line, the destruction of which would necessitate a long line of new levee of extremely difficult and costly construction. The construction of a new line would also require a long period of time, and a break in the front line in the meantime would be disastrous to a large section of the country below Kempe. Work on the revetment was begun in 1899, and continued each season since that time, until at the date of the last annual report of the Commission it had reached a length of 10,871 linear feet.

During the past season 2,300 linear feet of connecting mattress was placed along the inshore edge of the channel mats, between sections A and 12, 7,200 square feet of mattress was placed to repair breaks in the revetment, and 4,000 square feet of upper bank paving repaired.

The work has been successful thus far in protecting the levee, though numerous small failures of portions of the revetment have occurred, permitting the upper bank line to recede slightly. The present condition of the work is good.

Harbors at Natchez and Vidalia, Miss. and La., 688 miles below Cairo.—The object of this work is to prevent a threatened cut-off, which would destroy the harbors of Natchez and Vidalia and disturb the general regimen of the river for many miles above and below, and to prevent the destruction of the river front of the city of Natchez by caving of the bank.

The general project for this work, adopted in 1891, contemplated the construction of a levee on or near the axis of Cowpen Neck, to prevent a flow of water across the neck during high stages of the river, and the construction of about 16,000 linear feet of revetment in Giles Bend.

Work on the revetment in Giles Bend was begun in 1897 and continued each season since that time, until, at the date of the last annual report of the Commission, it had reached a length of 19,208 linear feet in two detached pieces of 8,192 and 11,016 feet, respectively.

During the past season the lower revetment in Giles Bend has been extended upstream 975 linear feet and downstream 145 linear feet, making the total length of subaqueous work 20,328 feet, in two detached pieces of 8,192 and 12,136 feet, respectively. The unprotected interval between the pieces is about 2,600 feet. Repairs were made to existing revetment between sections 28 and 30 by placing 109,890 square feet of new mattress, and extensive repairs were made to the upper-bank pavement along the lower revetment between sections 22 and 24, 27 and 30, and 42 and 43. The upper bank was graded over an area of 135,000 square feet and paved for 88,765 square feet.

On the Natchez front the bank was revetted with mattress 300 feet wide for a length of 2,550 linear feet in two detached pieces of 1,150 and 1,400 feet, respectively. The upper bank was graded for 1,794 linear feet and paved for 900 linear feet. The unprotected interval between the two pieces of revetment is 2,000 feet long.

The work in place has been successful, but the gap between the two detached pieces of revetment in Giles Bend must be closed. The levee along the axis of Cowpen Neck is in good condition.

Junction of the Mississippi, Red, and Atchafalaya rivers, Louisiana, 764 miles below Cairo.—The improvement in this locality consists in the maintenance of mattress sill dams in the Atchafalaya River for the purpose of preventing enlargement of that stream, and dredging the low-water channel of Old River for the purpose of maintaining an adequate depth between the Mississippi, Red, and Atchafalaya rivers.

The original sills were placed in 1887–88, and since that time no enlargement of the Atchafalaya for several miles above and below has been observed. The dams are apparently in good condition, and beyond slight repairs to maintain them, no further work is contemplated in this section.

During the past season dredging was required in lower Old River in order to maintain a suitable channel for navigation. A channel 1,250 feet long and averaging 100 feet wide at the bottom was dredged through the bar at the Mississippi entrance to Old River. No interruption to navigation occurred. The current through Old River was constant during the year from the Mississippi toward the Atchafalaya, no change of direction having occurred since June 15, 1906.

New Orleans Harbor, 965 miles below Cairo, right and left banks.—The object of the work in this harbor is to prevent the erosion of banks and consequent loss and damage to adjacent property. The work consists mainly of spur dikes placed at intervals of about 450 feet and of continuous revetment of the lower bank. In places where erosion was specially active continuous revetment was placed between the spurs.

Work under the present project was begun in 1883, and has continued each season as funds were available, until at the date of the last annual report of the Commission the banks were protected as follows: In Carrollton Bend for 7,930 feet by continuous mattress, and

for 1,970 feet 5 spur dikes in conjunction with continuous mattress; in Greenville Bend, opposite Audubon Park, for 1,940 feet by 2 spur dikes; in the Gouldsboro-Algiers Bend for 9,475 feet by 19 spur dikes; and in the Third District reach for 6,535 feet by 14 spur dikes, and for 1,240 feet by 2 spur dikes and a continuous mattress. A total of about 5½ miles of bank is thus protected by dikes and continuous revetment.

During the past season a mattress revetment 300 feet wide and covering 1,570 linear feet of bank was placed at Amesville in the bend extending from Westwego to Algiers. In the Third District reach the interval between spurs 2½ and 3 was mattressed, and the intervals between spurs 2 and 2½, 3 and 3½, and 3½ and 4 was partially mattressed, the aggregate of revetment work at this locality being 900 linear feet.

The steep banks and great depths of water make the preservation of the banks of the New Orleans Harbor both difficult and expensive, and the danger of sudden collapse in certain localities is by no means remote. Under the conditions here found it is of more than ordinary importance that ample means should be provided for the extension and completion of the revetment necessary to make the river banks along the city front reasonably safe.

For further details concerning the work in this district, see the report of Maj. James F. McIndoe, Corps of Engineers, U. S. Army, appended hereto.

PLANT IN THE SEVERAL DISTRICTS.

First and second districts.—This plant is located a short distance below Memphis when not in active service. During the year repair work was actively carried on and the plant was put in effective condition. The new plant added consists of 3 new barges, 2 pile drivers, and 6 skiffs. Nine other barges are now under construction. Two barges were wrecked and lost during the year while towing stone from Grand Tower.

For further details relative to plant in the first and second districts, reference is made to the reports of Capt. Wm. D. Connor.

Third district.—The plant pertaining to the third district is cared for at Vicksburg, Miss., when not in use. The hydraulic grader, authorized last year, is under construction; two new mat barges have been ordered; and a number of new material barges have been received. It is expected to have sufficient for outfitting two revetment parties when plant under construction is completed.

General repairs to plant were made during the year.

For further details regarding plant of the district, see report of Capt. C. S. Smith, hereto appended.

Stone for revetment work is supplied from a quarry purchased by the United States in 1899. This quarry is located at Searcy, Ark., and is operated when towing stages exist in the Little Red and White rivers.

For further details respecting stone in the third district, reference is made to the report of Captain Smith.

Fourth district.—The plant pertaining to the fourth district is cared for at New Orleans, La., and at Giles Bend, Mississippi. General repairs to the entire plant have been made, and it is now, with the exception of such portions as are worn-out, in good condition.

During the year 6 standard creosoted barges, 1 combined floating derrick and pile driver, and 1 hull for a levee-building machine were constructed by hired labor. The building of a new quarterboat has been commenced.

For further details of the plant in the fourth district, reference is made to the report of Maj. James F. McIndoe.

Other plant.—The steamer *Mississippi*, used for the inspection trips of the Commission, the steamers and quarterboat used in the general surveys, and the dredges, with the steamers, towboats, pile sinkers, and barges used in connection with the dredging operations, are cared for at West Memphis, Ark., where a general supply and repair depot has been established. Necessary repairs have been made during the year and the plant maintained in good condition. The tenth hydraulic dredge, the *B. M. Harrod*, has been received from the contractor, and one steamer, the *General T. L. Casey*, has been received from the St. Louis engineer district during the year.

For details of this plant reference is made to the report of Capt. G. R. Lukesh, secretary of the Commission.

SURVEYS IN THE ENGINEER DISTRICTS.

In order to keep in close touch with the condition of the improvement works, the caving banks, and changes affecting the regimen of the river, annual surveys are made, covering such portions of the river as may be required. The discussion of the results obtained will be found in the reports of the district officers herewith.

In addition to the above, special surveys were made of New Orleans Harbor and of Cypress Creek and the Arkansas River levees. Details of these will be found in the reports of Major McIndoe and Captain Smith, appended hereto.

LEVEES.

For convenience in administration and the allotment of funds for levee purposes, the river front has been divided by the Commission into levee districts. The names and locations of these districts, as authorized by the Commission, will be found on pages 2620–2621 of last year's annual report.

The following table, which is similar to that given in last year's report, has been brought up to date and shows the present condition of the levees and the levee operations during the past year, as compiled from the reports of the district officers:

Levee district.	In system.	Built.	Contents 1907.	Built since by United States.	Built since by local authorities.	Total built since 1907.
	Miles.	*Miles.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*	*Cubic yards.*
Upper St. Francis	90.00	47.50	1,338,411	591,644	343,137	934,781
Reelfoot	21.00	21.00	1,216,361	362,185	None.	362,185
Lower St. Francis	212.00	202.50	20,415,667	921,483	1,075,780	1,997,263
Upper Yazoo	124.00	124.00	27,118,153	65,906	1,176,681	1,242,587
White River	74.00	74.00	9,754,544	557,476	65,183	622,659
Lower Yazoo	188.50	188.50	39,225,231	918,504	1,061,133	1,979,637
Upper Tensas	194.00	190.60	34,563,708	726,086	913,862	1,639,948
Lower Tensas	160.92	152.64	21,035,860	464,886	1,188,289	1,653,175
Atchafalaya	128.60	128.60	21,734,975	99,664	577,826	677,490
Pontchartrain	125.69	125.69	17,485,077	548,780	192,459	741,239
Lafourche	82.21	82.21	9,146,640	205,225	274,911	480,136
Lake Borgne	77.08	77.08	3,785,499	144,368	59,943	204,311
Barataria	71.88	71.88	3,280,617	99,785	208,669	308,454
Total	1,549.88	1,486.20	210,100,743	5,705,992	7,137,873	12,843,865

Levee district.	Lost or abandoned during the year.	Contents 1908.	Required to complete.	Estimated final contents.	Percentage now built.
	Cu. yds.	*Cu. yds.*	*Cu. yds.*	*Cu. yds.*	
Upper St. Francis	92,000	2,181,192	.....	.....	.....
Reelfoot	None.	1,578,546	.....	.....	.....
Lower St. Francis	18,000	22,394,930	.....	.....	.....
Upper Yazoo	None.	28,360,740	.....	.....	.....
White River	28,500	10,348,703	.....	.....	.....
Lower Yazoo	810,000	40,394,868	12,200,000	52,594,868	77
Upper Tensas	543,100	35,660,556	12,554,000	48,214,556	74
Lower Tensas	793,316	21,895,719	8,603,277	30,498,996	71
Atchafalaya	369,339	22,043,126	3,196,689	25,239,815	87
Pontchartrain	243,840	17,982,476	3,865,781	21,848,257	82
Lafourche	229,719	9,397,057	2,203,842	11,600,899	80.9
Lake Borgne	34,000	3,955,810	1,375,908	5,331,718	74.2
Barataria	161,200	3,427,871	1,106,477	4,534,348	75.6
Total	3,323,014	219,621,594	.....	.....	.....

The "estimated final contents" of the levees given above is based on grades and sections, as heretofore provisionally recommended by the Commission. It is expected that these tentative grades will be revised and new grades based on the more recent flood data adopted during the coming year.

The loss of levee by abandonment on account of caving river banks or for other causes during the past year, as shown in the above table, was 3,323,014 cubic yards, which amounts to 1½ per cent of the contents of the existing levees.

During the past year the question of removing cross fences from the levees in the first and second districts has been under consideration. These cross fences, which had been placed on the levees in some of the levee districts by the owners of adjoining property, have proved to be a hindrance to the proper care and maintenance of the levees. After consultation with the United States district attorney, it was decided that the occupancy of the levees for this purpose was illegal, and the property owners have been severally notified by the officer in charge of the first and second districts to remove all such fences before September 1, 1908. Further details of this subject may be found in the report of Captain Connor appended hereto.

REVETMENTS FOR THE PROTECTION OF LEVEES AND THEIR IMPORTANCE IN THE DEVELOPMENT OF NAVIGABLE CHANNELS.

Reference was made in the last report to the importance of revetments in rapidly caving bends for the protection of levees at strategic points. The subject is so important that it deserves renewed attention by the Commission and by Congress. As a rule, the practice of the Commission has been in the past to build new levees at such distances from caving bends that they were supposed to be safe from attack for twenty years, and when any levees, old or new, have been threatened by caving, to build loops or new lines farther away from the river. But situations sometimes arise in which that recourse is desperately difficult; such as occur when the threatened levee stands on a narrow remaining strip between the river and a lake extending far back into the country. In such a case it is sometimes better economy to revet the bank than to move the levee.

The first revetment built for that purpose under the recommendation of the Commission was at Bolivar, in Mississippi, 417 miles below

Cairo, in 1888. The next was at Lake Providence, in Louisiana, 540 miles below Cairo, in 1894; the next at Bondurant Chute, Louisiana, 644 miles below Cairo, in 1899; and the next at Kempe Bend, Louisiana, 658 miles below Cairo, in 1899. These revetments were all undertaken with some hesitation and misgiving. But they have all succeeded well, and as mere means of preserving threatened levees from destruction have been profitable works.

The abandonment of a levee in a caving bend is likely to be attended by two injurious consequences in the channel. Such a change usually results in opening a high-water path across the point below the bend, which is liable to affect the regimen of the river injuriously for a considerable distance both above and below. Each such change also introduces a wide place in the high-water channel, with injurious effects on the low-water channel.

In view of these considerations the Commission has recommended the construction of revetments for the protection of levees more frequently within a few years past than formerly. Beginning with Longwood, Miss., 500 miles below Cairo, in 1904, revetments have been undertaken in Old Town Bend, Arkansas, 324 miles below Cairo; Fitlers Bend, Mississippi, 552 miles; Panther Forest, Arkansas, 451 miles; Vaucluse, Ark., 487 miles; and Reid-Bedford Bend, Louisiana, 605 miles. Further details regarding these works are given in the preceding pages of this report.

It is the judgment of the Commission that these revetment works and some others which will be imperative within a short time are required for the preservation of the levee system. Without them a permanently completed system will be impossible. The increasing height and cost of the levees and the rapid development of the country protected by them greatly augment the disaster of crevasses. A break in an embankment 5 or 6 feet high resulting in the thin overflow of a sparsely populated country is a small calamity compared with a break in a levee 20 feet high, discharging over a thickly populated country threaded with railroads and filled with towns and factories. Owing to the increased height now necessary to control the floods the expense of replacing an undermined levee by a new line going far around a lake or impassable swamp is enormous. The point of development has come at which the only economical way to maintain the levees is to hold the banks against caving—not everywhere, but in all places where the special conditions exist which have just been described. This is a distinct stage of the work only recently reached.

There is another consideration, not of the greatest weight, perhaps, but one which, in the opinion of the Commission, is worthy to be taken into account. It appears to be highly probable that before very many years the Government will undertake the development of a channel for navigation in the Mississippi River below Cairo of much greater depth than has been so far attempted. The river bed is now in favorable condition for such an improvement. But if the revetments which have been enumerated should be abandoned, or not effectively maintained, or others equally important should be omitted or neglected, and the river should be permitted to have its way in tearing down banks and building bars for a few years, changes will take place which can never be undone and which will greatly increase

the difficulty and expense of securing a deep channel. It is a case in which an ounce of prevention will be worth pounds of cure.

REVETMENTS FOR THE PROTECTION OF CITY FRONTS AND HARBORS.

Long ago Congress began making occasional appropriations for works to prevent destructive bank caving along city fronts, and so established precedents for such expenditures. Sometimes these works were provided for by specific appropriations for particular cities, and sometimes by provisions in the general appropriation for the improvement of the river, directing or permitting the expenditure of specific sums at specific places. Thus by a course of legislation extending over a long period of years Congress has unmistakably indicated an intent that the protection of city fronts and harbors should have a place in the general work of improvement of the river, to be supported by the Government. The States bordering the river below Cairo have never assumed any part of that burden. In a few instances a city itself has contributed funds toward its own protection, raised sometimes by local taxation and sometimes by private subscription. But as a rule the cost of such works is beyond the means of the city concerned.

The result of all this has been to create a situation of embarrassment to the Commission. The citizens along the river have come to think that they can rely on the Government to protect their cities against destruction by the river. When danger threatens they apply to the Commission. They are always advised to apply to Congress for a specific appropriation. When they fail in that, or the appropriation proves insufficient and they come back to the Commission, a painful dilemma is presented. It has been the practice of the Commission in such cases to withhold allotments to the last pinch of necessity. But when that comes allotments are made to the extent of available funds. Some city property has been lost by caving, but no city has been destroyed in whole or in large part. Such allotments have always been approved by the Secretary of War and, indirectly, by Congress, by making further appropriations without forbidding them.

Such a case is presented now in the harbor of New Orleans. A number of specific appropriations have been made for the improvement of that harbor in years gone by, and on several occasions allotments have been made by the Commission for that purpose out of the general appropriation, sometimes by express provision in the law and sometimes without it. The situation in that city has been a critical one for a number of years. As the concentration of the river's flow within its channel has progressed from year to year by the extension of the levee system the volume of water flowing in the channel past the city has necessarily increased. The resulting scour has steepened the subaqueous slope of the banks to such a degree that they tend to slip and slide into the river. Several such slips have occurred and others are to be apprehended. Last year the city of New Orleans undertook a great programme of improvement along the river front with a view of increasing the security of the city's protection against overflow and preparing the way for a large extension of dock room. This is in anticipation of an increase of trade gen-

erally, and particularly with the Orient. While this work was in progress an extensive slip took place in the bank. The Commission visited the ground and examined the situation personally. As in former cases, the citizens were advised to make an effort to secure a special appropriation for their harbor. There would be a propriety in such an appropriation beyond that existing in the case of any other city on the river. New Orleans is not merely a river town like Memphis or Natchez, but is also a seaport in as literal a sense as Boston or New York.

But the effort to obtain a special appropriation failed, and the Commission felt compelled, therefore, to allot out of the appropriation made by the act of May 27, 1908, the sum of $150,000 to New Orleans Harbor. A somewhat similar although not so urgent a situation exists at Natchez, and an allotment of $100,000 was made out of the appropriation for last year for work at that place. There has been an apparent disinclination on the part of Congress in recent years to make specific appropriations for particular places on the Mississippi, for which there are many manifest and strong reasons, and it seems probable that they will not be made as freely in the future as they have been in the past, if at all.

RECOMMENDATION OF INCREASED APPROPRIATION.

In view of all these circumstances—the urgent necessity for further revetments for the preservation of the levee system, the manifest wisdom and prudence of preserving unimpaired the present conditions of the channel for future improvement, and the probable necessity of taking considerable sums from the appropriation for the protection of city fronts and harbors, the Commission recommends an appropriation of $3,000,000 for the fiscal year ending June 30, 1910, as the least sum adequate to the necessities of the work.

HIGH WATER.

The present high-water season has been remarkable for the unusual duration of flood stages below Cairo, both on the main river and on the tributaries. Four crests of nearly the same height have passed Cairo at intervals of about a month during the season as follows:

First rise, February 26 (Cairo gauge)	feet	44.94
Second rise, March 18–19 (Cairo gauge)	do	45.55
Third rise, April 13 (Cairo gauge)	do	45.34
Fourth rise, May 19–20 (Cairo gauge)	do	45.06

The second of these, the maximum at this station for 1908, is 6.62 feet lower than the highest previously recorded, that of 1883, when the Cairo gauge read 52.17 feet.

The river at Cairo this season has been above the 40-foot stage for seventy-seven days, which in point of duration has only been exceeded by the season of 1882, when the river at that point was above the 40-foot stage for 105 days.

The lower tributaries being quite high during the passage of these rises to the Gulf, the high stages on the lower river were much increased and prolonged, so that the first three rises at Cairo merged and formed only two rises at Vicksburg, and finally resulted in one

almost continuous rise at New Orleans, the river at that point being above the 15-foot stage on the Carrollton gauge ever since the middle of March, 1908, or for over one hundred days. This exceeds in point of duration all previous records; the longest period before was eighty-five days in 1903.

While the river at Cairo this season has reached only a moderately high stage, it has been relatively much higher at the lower stations. The following are the highest readings of this year on gauges below the mouths of the principal tributaries and at New Orleans, together with the highest readings of 1907 and the differences, also the highest known stages:

Station.	Date.	1908.	1907.	Difference.	Highest known.	
					Year.	Reading.
		Feet.	*Feet.*	*Feet.*		*Feet.*
Cairo	March 18-19	45.55	50.33	−4.78	1883	52.17
Helena	March 26	45.20	50.39	−5.19	1897	51.75
Arkansas City	June 1-4	49.9	52.1	−2.2	1908	52.9
Vicksburg	June 5-8	47.9	49.65	−1.75	1897	52.48
Red River Landing	June 14-16	48.74	46.93	+1.81	1897	50.2
Carrollton	June 18	18.95	18.60	+ .35	1908	19.42

It will be noticed that the high water of this year is lower than that of 1907, except at Red River Landing and Carrollton, where the effect of the present flood in the Red River is apparent.

Notwithstanding the unusual length of time the water has been against the levees during the present high water, no breaks have occurred in the 1,486 miles of levee now existing in the various districts so far this year.

Careful preparations were made early in the season for protecting the levees, and the patrol of the lines on the lower river will be continued until the flood stage has passed.

For details concerning the protection of levees attention is invited to the reports of the district officers hereto appended.

The Commission is of the opinion that the sum of $3,000,000, in addition to available balances on July 1 of this year, can be profitably expended for continuing the improvement of the Mississippi River from the Head of Passes to the mouth of the Ohio River during the fiscal year ending June 30, 1910.

Respectfully submitted.

WM. H. BIXBY,
Colonel, Corps of Engineers, U. S. Army,
President, Mississippi River Commission.

ROBERT S. TAYLOR,
J. A. OCKERSON,
HENRY B. RICHARDSON,
HOMER P. RITTER,
Assistants, U. S. Coast and Geodetic Survey.

WM. T. ROSSELL,
Colonel, Corps of Engineers, U. S. Army.

J. G. WARREN,
Lieut. Col., Corps of Engineers, U. S. Army.

The CHIEF OF ENGINEERS, U. S. ARMY.

Money statements.

APPROPRIATIONS EXPENDED UNDER MISSISSIPPI RIVER COMMISSION.

Appropriation for improving Mississippi River.

July 1, 1907, balance unexpended		[a] $4,779,193.62
Amount appropriated by sundry civil act approved May 27, 1908	$2,000,000.00	
Miscellaneous receipts from reimbursements, sales of engineer property under the provisions of section 5 of river and harbor act of June 13, 1902, and other sales	412.57	
		2,000,412.57
		6,779,606.19
June 30, 1908, amount expended during fiscal year		2,777,691.83
July 1, 1908, balance unexpended		4,001,914.36
July 1, 1908, outstanding liabilities	72,829.34	
July 1, 1908, amount covered by uncompleted contracts	1,231,337.31	
		1,304,166.65
July 1, 1908, balance available		2,697,747.71
Distributed as follows:		
Mississippi River Commission		28,468.26
Surveys, gauges, and observations		79,509.44
Levees		906,506.56
Revetment and contraction works, permanent channel improvements and protection		653,676.63
Dredges and dredging		466,196.69
Plant and miscellaneous		209,301.33
Improving harbors and tributaries		344,088.80
Unallotted		10,000.00
		2,697,747.71

Amount necessary to be appropriated for the fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908.

For continuing the improvement of the Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission	$3,000,000.00

Appropriation for gauging waters of the Mississippi River and its tributaries.[b]

July 1, 1907, balance unexpended	$2,900.52
Amount allotted by Chief of Engineers, July 24, 1907, from permanent annual appropriation made by section 6 of river and harbor act of August 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902	9,100.00
	12,000.52

[a] The amount, $4,779,189.40, reported in Annual Report for 1907, has been increased $4.22 during the fiscal year by the following refundments of overpayments:

By secretary:	
November, 1907, allotment for "Dredges and dredging"	$0.65
By first and second districts officer—	
September, 1907, allotment for "Upper St. Francis levee district"	1.92
September, 1907, allotment for "Reelfoot levee district"	1.65
	4.22

[b] The custody and care of the gauges maintained under this appropriation were assumed by the Mississippi River Commission February 11, 1901, on which date they were transferred to the secretary, under authority of Secretary of War, dated January 25, 1901.

June 30, 1908, amount expended during fiscal year	$8,609.26	
June 30, 1908, amount reverted to Treasury during fiscal year	720.66	
		$9,329.92
July 1, 1908, balance unexpended		2,670.60
July 1, 1908, outstanding liabilities		1,284.91
July 1, 1908, balance available		1,385.69
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908		9,100.00

Itemized statement of expenditures during the fiscal year ending June 30, 1908, submitted in compliance with requirement of section 6 of river and harbor act of August 11, 1888.

Observations:		
Pay of permanent gauge observers		$3,595.00
Inspections and repairs:		
Inspection of gauges on Mississippi River by junior engineers and parties on steamers	$1,817.60	
Inspection of gauges on tributaries	290.60	
Renewals and repairs of gauges and bulletins	140.42	
		2,248.62
Instruments:		
Purchase of new instruments		163.50
Office expenses and contingencies:		
Pay of assistant and junior engineers, recorders and clerks	2,172.19	
Stationery, printing, office rent, etc	429.95	
		2,602.14
		8,609.26

CONSOLIDATED STATEMENT OF ALL APPROPRIATIONS EXPENDED UNDER THE MISSISSIPPI RIVER COMMISSION TO JUNE 30, 1908.

Appropriation for improving Mississippi River.

Act of June 28, 1879 (organic)	$175,000.00
Act of June 16, 1880 (sundry civil)	150,000.00
Act of March 3, 1881 (river and harbor)	1,000,000.00
Act of March 3, 1881 (sundry civil)	150,000.00
Act of August 2, 1882 (river and harbor)	4,123,000.00
Act of August 7, 1882 (sundry civil)	150,000.00
Act of March 3, 1883 (sundry civil)	150,000.00
Act of January 19, 1884 (river and harbor)	1,000,000.00
Act of July 5, 1884 (river and harbor)	75,000.00
Act of July 5, 1884 (river and harbor), less $5,000 transferred to snag-boat service	2,065,000.00
Act of July 7, 1884 (sundry civil)	75,000.00
Act of August 5, 1886 (river and harbor), less $5,942.60 for expenses, office Chief of Engineers	1,994,057.40
Act of August 5, 1886 (river and harbor), less $47.30 for expenses, office Chief of Engineers	29,952.70
Act of August 11, 1888 (river and harbor), less $4,859 for expenses, office Chief of Engineers	2,840,141.00
Act of August 11, 1888 (river and harbor)	75,000.00
Act of October 2, 1888 (sundry civil)	35,000.00
Act of October 19, 1888 (deficiency), less $4,214.39 reverted to the Treasury	20,785.61
Act of September 19, 1890 (river and harbor)	3,200,000.00
Act of September 30, 1890 (deficiency)	5,625.00
Act of March 3, 1891 (deficiency)	1,950.00
Act of March 3, 1891 (joint resolution)	1,000,000.00
Act of July 13, 1892 (river and harbor)	2,470,000.00
Act of July 28, 1892 (deficiency)	44.80
Act of March 3, 1893 (sundry civil)	2,665,000.00
Act of August 18, 1894 (river and harbor)	485,000.00
Act of August 18, 1894 (sundry civil)	2,665,000.00

Act of March 2, 1895 (sundry civil)		$2,665,000.00
Act of June 3, 1896 (river and harbor)		909,000.00
Joint resolution approved March 31, 1897 (Public, No. 6)		250,000.00
Act of June 4, 1897 (sundry civil)		2,933,333.00
Act of July 19, 1897 (deficiency)		625,000.00
Act of July 1, 1898 (sundry civil)		1,983,333.00
Act of March 3, 1899 (sundry civil)		2,583,333.00
Act of March 3, 1899 (river and harbor)		185,000.00
Act of June 6, 1900 (sundry civil), less $5,000 for expenses, office Chief of Engineers		2,245,000.00
Act of June 13, 1902 (river and harbor)		2,200,000.00
Act of March 3, 1903 (sundry civil)		2,000,000.00
Act of April 28, 1904 (sundry civil)		2,000,000.00
Act of March 3, 1905 (river and harbor)		1,000,000.00
Act of March 3, 1905 (sundry civil)		2,000,000.00
Act of June 30, 1906 (sundry civil)		2,000,000.00
Act of March 2, 1907 (river and harbor)		3,000,000.00
Act of May 27, 1908 (sundry civil)		2,000,000.00
Total specific appropriations		57,179,555.51
Balances from former appropriations applied to works below Cairo under act of August 2, 1882, less $123.42 reverted to Treasury	$272,504.96	
Same for works above Cairo, under act of July 5, 1884	22,632.53	
Total balances		295,137.49
Miscellaneous receipts:		
Previously reported	35,111.24	
Amount collected from the Pittsburg Coal Company for damages by steamer *Fritz* to U. S. barge *No. 9407* credited to "Plant," first and second districts, May, 1907	29.81	
Amounts received from sales of engineer property, under the provisions of section 5 of river and harbor act of June 13, 1902, and sales of blueprints:		
By secretary—		
From sales of condemned engineer property, credited in December, 1907; $1 to "Mississippi River Commission," and $2 to "Surveys, gauges, and observations"	3.00	
By first and second districts officer—		
From sales of engineer property, credited to "Plant" in following months:		
September, 1907	23.25	
October, 1907	34.50	
From sale of blueprints, credited to "Surveys," February, 1907	.25	
By third district officer—		
From sales of engineer property, credited to "Plant," July, 1907	59.60	
By fourth district officer—		
From sales of engineer property, credited to "Plant," July, 1907	257.41	
From sales of blueprints, credited in following months to allotments named:		
July, 1907, "Surveys, gauges, and observations"	1.25	
November, 1907, "Surveys, gauges, and observations"	1.75	
February, 1908, "Plant"	.25	
April, 1908, "New Orleans Harbor"	1.25	
June, 1908, "Surveys, gauges, and observations"	.25	
Total miscellaneous receipts		35,523.81
Total		57,510,216.81

EXPENDED.

Location and object.	To June 30, 1907.	During year ending June 30, 1908.	Total.
Mississippi River Commission	$803,017.24	$32,100.90	$835,118.14
Surveys, gauges, and observations	2,311,241.64	82,838.06	2,394,079.70
Levees	[a] 21,234,650.25	1,327,894.20	22,562,544.45
Revetment and contraction works, permanent channel improvements and protection	11,559,781.65	413,997.23	11,973,778.88
Dredges and dredging	[b] 4,207,699.05	295,162.10	4,502,861.15
Experimental dikes	100,000.00	.....	100,000.00
Plant and miscellaneous	2,689,990.29	325,825.99	3,015,816.28
Improving harbors and tributaries except Vicksburg Harbor	6,503,616.99	299,873.35	6,803,490.34
Improving Vicksburg Harbor	582,980.98	.....	582,980.98
Works above Cairo	737,632.58	.....	737,632.58
Total expended	50,730,610.62	2,777,691.83	53,508,302.45
Balance unexpended June 30, 1908	.....	.....	2,001,914.36
Allotments available July 1, 1908	.....	.....	1,990,000.00
Unallotted	.....	.....	10,000.00
Total appropriated, etc.	.....	.....	57,510,216.81

[a] The amount, $21,234,653.82, reported in Annual Report for 1907, is reduced $3.57 on account of following refundments, during the fiscal year, of overpayments:

By first and second districts officer—

September, 1907, allotment for "Upper St. Francis levee district"	$1.92
September, 1907, allotment for "Reelfoot levee district"	1.65
	3.57

[b] The amount, $4,207,699.70, reported in Annual Report for 1907, is reduced 65 cents on account of refundment by Secretary in November, 1907, of overpayment.

Appropriation for gauging waters of the Mississippi River and its tributaries.

Allotments from general appropriations for examinations, surveys, and contingencies of rivers and harbors by acts of—	
March 3, 1871	$5,000.00
June 10, 1872	5,000.00
March 3, 1873	5,000.00
June 23, 1874	5,000.00
March 3, 1875	5,000.00
Specific appropriations by river and harbor acts of—	
August 14, 1876	5,000.00
June 18, 1878	5,000.00
March 3, 1879	5,000.00
June 14, 1880	5,000.00
March 3, 1881	5,000.00
August 2, 1882	5,000.00
Deficiency act of March 12, 1884	2,100.00
Specific appropriations by river and harbor acts of—	
July 5, 1884	5,000.00
August 5, 1886	5,000.00
Allotted from specific appropriation by river and harbor act of August 11, 1888	8,700.00
Deficiency act of October 19, 1888	3,600.00
Allotments from permanent indefinite appropriation made by section 6 of river and harbor act of August 11, 1888, for fiscal years, viz:	
1890	9,000.00
1891 (less $3,518.34 withheld in United States Treasury under ruling that only $6,000.00 can be expended each fiscal year)	5,181.66
1892	5,100.00
1893	5,500.00
1894	5,500.00
1895	5,500.00
1896	5,500.00
1897	5,500.00
1898	5,500.00
1899	6,000.00
1900	5,500.00
1901	6,000.00
1902	6,000.00

Allotments from permanent annual appropriation made by section 6 of river and harbor act of August 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902, for fiscal years, viz:

1903	$9,100.00
1904	9,100.00
1905	9,100.00
1906	9,100.00
1907	9,100.00
1908	9,100.00
Total	209,781.66

EXPENDED.

	To June 30, 1907.	During year ending June 30, 1908.	Total.
Expenditures	$186,946.22	$8,609.26	$195,555.48
Unexpended balances reverted to Treasury	10,834.92	720.66	11,555.58
Total	197,781.14	9,329.92	207,111.06
Unexpended balance June 30, 1908			2,670.60
Total appropriated, etc.			209,781.66

Appropriation for repairing Government levee at Walnut Bend, Ark.[a]

Act of June 13, 1902 (river and harbor)	$90,000.00
Expended to June 30, 1906	90,000.00

Appropriation for waterway from Lockport, Ill., to St. Louis, Mo.

Act of June 13, 1902 (river and harbor)	$25,000.00
Amount transferred from allotment for "Survey of Illinois and Des Plaines rivers, Ill.," as reimbursement	1,093.40
Total	26,093.40

EXPENDED.

	To June 30, 1907.	During year ending June 30, 1908.	Total.
Expenditures	$22,291.23		$22,291.23
Unexpended balance reverting to Treasury			[b] 3,802.17
Total appropriated, etc.			26,093.40

[b] Less $6.50 outstanding liabilities (unclaimed wages).

Appropriation for emergencies in river and harbor works.

Allotments from appropriation by act of April 28, 1904—	
For Wolf River	$8,000
For Giles Bend, Miss	40,000
	48,000
Expended in fiscal year 1905	48,000

Appropriation for examinations, surveys, and contingencies of rivers and harbors.

Allotments from appropriation by river and harbor act of March 3, 1905—	
For Ashport, Tenn	$485
Expended in fiscal year 1906	485

[a] Prior to June 30, 1906, was reported under appropriation for "Improving Mississippi River."

Consolidated statement of condition of appropriations and allotments und — Mississippi River Commission on June 30, 1908.

SECRETARY MISSISSIPPI RIVER COMMISSION.

[Appropriation: Improving Mississippi River; gauging waters of the Mississippi Riv— and its tributaries; waterway from Lockport, Ill., to St. Louis, Mo.]

	Appropriation for improving Mississippi River, allotment for—				
	Mississippi River Commission.	Surveys, gauges, and observations.	Dredges and dredging.	Expended allotments.	Total.
Amount expended on previous projects	$238,110.74	$855,247.37	.....	.....	$1,093,358.11
Amount expended on present project to end of last fiscal year	564,906.50	1,103,568.04	$3,817,694.94	[a] $46,131.14	5,531,700.62
Balance unexpended at end of last fiscal year	34,375.25	67,912.31	429,267.70	.....	531,555.26
Amount appropriated or allotted since (net)	7,001.00	10,002.00	69,453.86	.....	86,456.86
	41,376.25	77,914.31	498,721.56	.....	618,012.12
Amount expended from beginning of present fiscal year to end of previous month	31,222.10	54,737.87	277,095.94	.....	363,055.91
Amount expended during the month	[b] 878.80	[c] 6,539.59	[d] 18,066.16	.....	25,484.55
	32,100.90	61,277.46	295,162.10	.....	388,540.46
Balance unexpended at end of month	9,275.35	16,636.85	203,559.46	.....	229,471.66
In Treasury United States	9,275.35	10,313.58	185,578.39	.....	205,167.32
In hand	.....	6,323.27	17,981.07	.....	24,304.34
	9,275.35	16,636.85	203,559.46	.....	229,471.66
Outstanding liabilities at end of month	2,807.09	5,326.53	24,337.77	.....	32,471.39
Amount covered by existing contracts at end of month	.....	.....	47,025.00	.....	47,025.00
	2,807.09	5,326.53	71,362.77	.....	79,496.39
Balance available at end of month	6,468.26	11,310.32	132,196.69	.....	149,975.27

[a] Experimental dikes, $45,075.58; patrol of the Mississippi River, $1,055.56.
[b] Includes $0.64 } In Treasury settlement No. 4768, June 16, 1908, with Star Union Line
[c] Includes 1.27 } for freight transportation in January, 1908. (ED 7184–259, sec.
[d] Includes 4.44 } MRC 351–3.)

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

SECRETARY MISSISSIPPI RIVER COMMISSION—continued.

	Appropriation for gauging waters of the Mississippi River and its tributaries.	Appropriation for waterway from Lockport, Ill., to St. Louis, Mo.	Grand total.
Amount expended on previous projects	.....	.....	$1,093,358.11
Amount expended on present project to end of last fiscal year	$186,946.22	$22,291.23	5,740,938.07
Balance unexpended at end of last fiscal year	2,900.52	3,802.17	538,257.95
Amount appropriated or allotted since (net)	9,100.00	.....	95,556.86
	12,000.52	3,802.17	633,814.81
Amount expended from beginning of present fiscal year to end of previous month	7,959.42	.....	371,015.33
Amount expended during the month	649.84	.....	26,134.39
	8,609.26	.....	397,149.72
Balance unexpended at end of month	[a] 2,670.60	3,802.17	235,944.43
In Treasury United States	1,100.00	3,802.17	210,069.49
In hand	1,570.60	.....	25,874.94
	2,670.60	3,802.17	235,944.43
Outstanding liabilities at end of month	1,284.91	6.50	33,762.80
Amount covered by existing contracts at end of month	.....	.....	47,025.00
	1,284.91	6.50	80,787.80
Balance available at end of month	1,385.69	3,795.67	155,156.63

[a] $720.66 of the unexpended balance for 1907 reverts to the Treasury.

WORKS ABOVE CAIRO.

[Appropriation: Improving Mississippi River.]

	Protection near Cairo.[a]	Des Moines Rapids to Ohio River.	Total.
Amount expended on present project to end of last fiscal year	$50,000.00	$687,632.53	$737,632.53

[a] Includes only work under act of July 5, 1884.

NOTE.—The allotments made at the one hundred and fifth session of the Mississippi River Commission from the appropriation by sundry civil act of May 27, 1908, will be taken up in the month of July, 1908.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

FIRST AND SECOND DISTRICTS.

[Appropriations: Improving Mississippi River; repairing Government levee at Walnut Bend, Ark.; emergencies in river and harbor works; examinations, surveys, and contingencies of rivers and harbors.]

	Improving Mississippi River, allotment for—				
	Surveys.	Upper St. Francis levee district.	Lower St. Francis levee district.	White River levee district.	Reelfoot levee district.
Amount expended on present project to end of last fiscal year	$127,357.99	$126,418.38	$1,391,894.23	$1,678,477.30	$106,854.22
Balance unexpended at end of last fiscal year	6,305.62	228,381.62	338,781.19	221,992.30	63,145.78
Amount appropriated or allotted since (net)	.25	.....	.....	.....	.....
	6,305.87	228,381.62	338,781.19	221,992.30	63,145.78
Amount expended from beginning of present fiscal year to end of previous month	5,891.55	118,198.28	179,831.15	118,701.46	63,145.78
Amount expended during the month	398.33	4,747.44	7,552.48	1,820.64	.....
	6,289.88	122,945.72	187,383.63	120,522.10	63,145.78
Balance unexpended at end of month	15.99	105,435.90	151,397.56	101,470.20	.....
In Treasury United States	.....	94,800.00	143,641.46	83,804.40	.....
In hand	15.99	10,635.90	7,756.10	17,665.80	.....
	15.99	105,435.90	151,397.56	101,470.20	.....
Outstanding liabilities at end of month	15.99	335.90	2,000.00	1,000.00	.....
Amount covered by existing contracts at end of month	.....	60,100.00	97,663.39	96,566.96	.....
	15.99	60,435.90	99,663.39	97,566.96	.....
Balance available at end of month	.....	45,000.00	51,734.17	3,903.24	.....

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

FIRST AND SECOND DISTRICTS—continued.

	Improving Mississippi River, allotment for—				
	Upper Yazoo levee district.	Chute of Island 26 (abatis dikes).	Plum Point reach.	Walnut Bend, Ark.	Old Town Bend, Ark.
Amount expended on present project to end of last fiscal year	$1,406,496.88	.....	$5,352,807.07	$17,410.13	$11,313.03
Balance unexpended at end of last fiscal year	29,854.90	.....	37,123.98	85,478.46	132,705.78
Amount appropriated or allotted since (net)	.....	15,392.52	.....	.....	.....
	29,854.90	15,392.52	37,123.98	85,478.46	132,705.78
Amount expended from beginning of present fiscal year to end of previous month	16,402.92	1,350.28	2,425.93	78,952.36	131,249.86
Amount expended during the month	.....	.....	3,331.97	328.56	23.06
	16,402.92	1,350.28	5,757.90	79,280.92	131,272.92
Balance unexpended at end of month	13,451.98	14,042.24	31,366.08	6,197.54	1,432.86
In Treasury United States	9,000.00	9,392.52	29,456.05	.....	331.39
In hand	4,451.98	4,649.72	1,910.03	6,197.54	1,101.47
	13,451.98	14,042.24	31,366.08	6,197.54	1,432.86
Outstanding liabilities at end of month	200.00	.....	.....	500.00	300.00
Amount covered by existing contracts at end of month	5,555.98	.....	7,500 00	.....	.....
	5,755.98	.....	7,500.00	500.00	300.00
Balance available at end of month	7,696.00	14,042.24	23,866.08	5,697.54	1,132.86

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

FIRST AND SECOND DISTRICTS—continued.

	Improving Mississippi River, allotment for—					
	Plant.	At Hickman, Ky.	At New Madrid, Mo.	Caruthersville, Mo.	Hopefield Bend (preservation of works at).	At Helena, Ark.
Amount expended on present project to end of last fiscal year	$1,135,078.10	$94,759.73	$150,479.15	$78,225.04	$399,401.88	$210,413.67
Balance unexpended at end of last fiscal year	67,519.71	372.27	2,520.85	1,589.33	38,139.73	1,086.33
Amount appropriated or allotted since (net)	92,087.56	.....	.....	.....	11,774.74	.....
	159,607.27	372.27	2,520.85	1,589.33	49,914.47	1,086.33
Amount expended from beginning of present fiscal year to end of previous month	103,464.23	.....	.....	70.00	49,794.40	.....
Amount expended during the month	21,345.19	.....	.....	.....	.....	.....
	124,809.42	.....	.....	70.00	49,794.40	.....
Balance unexpended at end of month	34,797.85	372.27	2,520.85	1,519.33	120.07	1,086.33
In Treasury United States	44,139.78	.....	1,000.00	314.37	28.31	.....
In hand	10,658.07	372.27	1,520.85	1,204.96	91.76	1,086.33
	34,797.85	372.27	2,520.85	1,519.33	120.07	1,086.33
Outstanding liabilities at end of month	10,000.00	.....	.....	.....	50.00	.....
Amount covered by existing contracts at end of month	16,640.00	.....	.....	.....	.....	.....
	26,640.00	.....	.....	.....	50.00	.....
Balance available at end of month	8,157.85	372.27	2,520.85	1,519.33	70.07	1,086.33

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

FIRST AND SECOND DISTRICTS—continued.

	Improving Mississippi River, allotment for—			Expended appropriations.	Grand total.
	At Memphis, Tenn. (Wolf River).	Expended allotments.	Total.		
Amount expended on present project to end of last fiscal year	$23,468.35	[a] $2,168,878.20	$14,479,733.05	[b] $98,485.00	$14,578,218.05
Balance unexpended at end of last fiscal year	2,317.65	.....	1,257,315.50	.....	1,257,315.50
Amount appropriated or allotted since (net)	.....	.....	119,255.07	.....	119,255.07
	2,317.65	.....	1,376,570.57	.....	1,376,570.57
Amount expended from beginning of present fiscal year to end of previous month	2,317.65	.....	871,795.85	.....	871,795.85
Amount expended during the month	.....	.....	39,547.67	.....	39,547.67
	2,317.65	.....	911,343.52	.....	911,343.52
Balance unexpended at end of month	.....	.....	465,227.05	.....	465,227.05
In Treasury United States	.....	.....	395,908.28	.....	395,908.28
In hand	.....	.....	69,318.77	.....	69,318.77
	.....	.....	465,227.05	.....	465,227.05
Outstanding liabilities at end of month	.....	.....	14,401.89	.....	14,401.89
Amount covered by existing contracts at end of month	.....	.....	284,026.33	.....	284,026.33
	.....	.....	298,428.22	.....	298,428.22
Balance available at end of month	.....	.....	166,798.83	.....	166,798.83

[a] Preservation of works, $54,867.89; Walnut Bend levee, preservation of works at, $28,200; removal of Nonconnah rock, $9,000; dredges and dredging, $388,097.12; Columbus, Ky., $43,750; improving St. Francis River (Walnut Bend levee), $75,000; at Memphis, Tenn., $45,000; improving harbor at Memphis, Tenn., $1,425,038.77; improving harbor at Memphis, Tenn. (Wolf River), $45,000; dikes, $54,924.42.

[b] Repairing Government levee at Walnut Bend, Ark., $90,000; emergencies in river and harbor works (for Wolf River), $8,000; examinations, surveys, and contingencies of rivers and harbors, $485.

NOTE.—The allotments made at the one hundred and fifth session of the Mississippi River Commission from the appropriation by sundry civil act of May 27, 1908, will be taken up in the month of July, 1908.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

THIRD DISTRICT.

[Appropriation: Improving Mississippi River.]

	Improving Mississippi River, allotment for—				
	Surveys.	Lower Yazoo levee district.	Upper Tensas levee district.	Lake Providence reach.	Stone.
Amount expended on present project to end of last fiscal year	$108,923.67	$3,870,069.78	$5,081,318.80	$3,900,212.47	$341,100.00
Balance unexpended at end of last fiscal year	10,000.00	403,204.89	391,339.00	33,670.28	43,043.07
	10,000.00	403,204.89	391,339.00	33,670.28	43,043.07
Amount expended from beginning of present fiscal year to end of previous month	9,971.24	198,454.58	200,907.10	26,336.26	41,020.49
Amount expended during the month	.....	2,694.69	3,402.74	27.58	2,022.58
	9,971.24	201,149.27	204,309.84	26,363.84	43,043.07
Balance unexpended at end of month	28.76	202,055.62	187,029.16	7,306.44	.....
In Treasury United States	.....	190,999.43	185,958.42	5,970.00	.....
In hand	28.76	11,056.19	1,070.74	1,336.44	.....
	28.76	202,055.62	187,029.16	7,306.44	.....
Outstanding liabilities at end of month	28.76	200.00	300.00	.....	.....
Amount covered by existing contracts at end of month	.....	183,300.00	167,400.00	.....	.....
	28.76	183,500.00	167,700.00	.....	.....
Balance available at end of month	.....	18,555.62	19,329.16	7,306.44	.....

***Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908*—Continued.**

THIRD DISTRICT—continued.

	Improving Mississippi River, allotment for—				
	Repairs to revetment at Lake Providence and general repairs including quarrying of stone.	General repairs to existing works.	Plant.	Greenville Miss.	Lake Bolivar front.
Amount expended on present project to end of last fiscal year	(a)		$1,133,927.26	$944,869.46	$215,255.31
Balance unexpended at end of last fiscal year	(b)	c $30,000.00	164,413.80	2,287.93	38,541.76
Amount appropriated or allotted since (net)			16,059.60		
		30,000.00	180,473.40	2,287.93	38,541.76
Amount expended from beginning of present fiscal year to end of previous month		16,567.81	112,830.81	2,287.93	38,541.76
Amount expended during the month			7,820.11		
		16,567.81	120,650.92	2,287.93	38,541.76
Balance unexpended at end of month		13,432.19	59,822.48		
In Treasury United States		11,000.00	53,962.33		
In hand		2,432.19	5,860.15		
		13,432.19	59,822.48		
Outstanding liabilities at end of month		200.00	3,500.00		
Amount covered by existing contracts at end of month			35,179.00		
		200.00	38,679.00		
Balance available at end of month		13,232.19	21,143.48		

[a] $18,325.06 expended in fiscal year 1907, distributed to following works: Ashbrook Neck, $2,624.59; Lake Providence reach, $14,987.98; Lake Bolivar front, $616.95; Fitlers Bend, $47.77; Reid-Bedford Bend, $47.77.

[b] Balance, $30,000, reported under this allotment June 30, 1907, transferred to allotment for "General repairs to existing works."

[c] Transferred from allotment for "Repairs to revetment at Lake Providence and general repairs, including quarrying of stone."

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

THIRD DISTRICT—continued.

	Improving Mississippi River, allotment for—				
	Longwood, Miss.	Fliters Bend.	Reid-Bedford Bend.	Expended allotments.	Total.
Amount expended on present project to end of last fiscal year	$157,010.28	$5,567.06	$86,213.65	*$1,332,528.75	$17,176,996.49
Balance unexpended at end of last fiscal year	.....	91,980.71	103,834.12	.....	1,312,315.56
Amount appropriated or allotted since (net)	.....	.....	.....	.....	16,059.60
	.....	91,980.71	103,834.12	.....	1,328,375.16
Amount expended from beginning of present fiscal year to end of previous month	.....	49,276.34	4,426.32	.....	700,620.64
Amount expended during the month	.....	3,600.59	7,187.47	.....	26,755.76
	.....	52,876.93	11,613.79	.....	727,376.40
Balance unexpended at end of month	.....	39,103.78	92,220.33	.....	600,998.76
In Treasury United States	.....	37,500.00	92,220.33	.....	577,610.51
In hand	.....	1,603.78	.....	.....	23,388.25
	.....	39,103.78	92,220.33	.....	600,998.76
Outstanding liabilities at end of month	.....	3,333.33	6,666.67	.....	14,228.76
Amount covered by existing contracts at end of month	.....	5,000.00	12,000.00	.....	402,879.00
	.....	8,333.33	18,666.67	.....	417,107.76
Balance available at end of month	.....	30,770.45	73,553.66	.....	183,891.00

* Improving harbor at Vicksburg, Miss., $442,724.77; Delta Point, La., $186,256.21; Ashbrook Neck, $703,547.77.

NOTE.—The allotments made at the one hundred and fifth session of the Mississippi River Commission from the appropriation by sundry civil act of May 27, 1908, will be taken up in the month of July, 1908.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

FOURTH DISTRICT.

[Appropriations: Improving Mississippi River; improving harbor at Natchez and Vidalia, Miss. and La.; improving harbor of New Orleans, La.; improving Atchafalaya and Red rivers, Louisiana; emergencies in river and harbor works.]

	Improving Mississippi River, allotment for—				
	Surveys, gauges, and observations.	Lower Tensas levee district.	Atchafalaya levee district.	Lafourche levee district.	Barataria levee district.
Amount expended on present project to end of last fiscal year	$116,144.57	$2,909,201.00	$1,608,637.18	$643,501.36	$382,880.77
Balance unexpended at end of last fiscal year	5,995.35	608,848.44	61,472.48	47,982.56	51,852.10
Amount appropriated or allotted since (net)	a 3.25	.....	.....	.....	.....
	5,998.60	608,848.44	61,472.48	47,982.56	51,852.10
Amount expended from beginning of present fiscal year to end of previous month	5,241.98	164,015.24	22,184.10	28,509.58	28,786.82
Amount expended during the month	57.50	2,080.82	2,620.51	66.87	362.43
	5,299.48	166,096.06	24,804.61	28,576.45	29,149.25
Balance unexpended at end of month	699.12	442,752.38	36,667.87	19,406.11	22,702.85
In Treasury of United States	500.25	440,000.00	30,000.00	18,500.00	21,000.80
In hand	198.87	2,752.38	6,667.87	906.11	1,702.05
	699.12	442,752.38	36,667.87	19,406.11	22,702.85
Outstanding liabilities at end of month	.....	77.97	20.41	.....	2,272.50
Amount covered by existing contracts at end of month	.....	399,499.23	29,566.86	.....	9,700.40
	.....	399,577.20	29,587.27	.....	11,972.90
Balance available at end of month	699.12	43,175.18	7,080.60	19,406.11	10,729.95

a Includes 25 cents, amount received from sale of blueprints.

Consolidated statement of condition of appropriations and allotments u Mississippi River Commission on June 30, 1908—Continued.

FOURTH DISTRICT—continued.

	Improving Mississippi River, allotment for—				
	Pontchartrain levee district.	Lake Borgne levee district.	Bondurant.	Kempe Bend revetment.	Pla
Amount expended on present project to end of last fiscal year	$1,506,514.02	$342,277.33	$54,724.95	$668,661.04	$419,
Balance unexpended at end of last fiscal year	194,320.71	54,917.80	6,275.05	47,338.96	81,
Amount appropriated or allotted since (net)	.....	.....	.....	.....	
	194,320.71	54,917.80	6,275.05	47,338.96	81,
Amount expended from beginning of present fiscal year to end of previous month	113,314.31	47,432.85	6,273.88	15,029.42	69,
Amount expended during the month	2,397.54	263.87	.....	657.53	11,
	115,711.85	47,696.72	6,273.88	15,686.95	80,
Balance unexpended at end of month	78,608.86	7,221.08	1.17	31,652.01	1,
In Treasury United States	75,000.00	6,000.00	.....	22,000.00	
In hand	3,608.86	1,221.08	1.17	9,652.01	1,
	78,608.86	7,221.08	1.17	31,652.01	1,
Outstanding liabilities at end of month	.....	2,292.92	1.17	1,076.84	1,
Amount covered by existing contracts at end of month	54,410.94	4,229.55	.....	.....	.....
	54,410.94	6,522.47	1.17	1,076.84	1,
Balance available at end of month	24,197.92	698.61	.....	30,575.17	.....

***Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908*—Continued.**

FOURTH DISTRICT—continued.

	Improving Mississippi River, allotment for—			
	Natchez and Vidalia harbors, Miss. and La.	New Orleans Harbor, La.	Atchafalaya and Red rivers, La.	Giles Bend.
Amount expended on present project to end of last fiscal year	$414,718.77	$208,533.03	$35,358.14	.....
Balance unexpended at end of last fiscal year	[a] 182,283.33	100,217.47	13,308.28	([b])
Amount appropriated or allotted since (net)	.....	1.25	.....	.....
	182,283.33	100,218.72	13,308.28	.....
Amount expended from beginning of present fiscal year to end of previous month	132,376.37	91,049.37	3,106.88	.....
Amount expended during the month	3,072.17	1,165.76	.....	.....
	135,448.54	92,215.13	3,106.88	.....
Balance unexpended at end of month	46,834.79	8,003.59	10,201.40	.....
In Treasury United States	46,000.00	5,001.25	10,166.42	.....
In hand	834.79	3,002.34	34.98	.....
	46,834.79	8,003.59	10,201.40	.....
Outstanding liabilities at end of month	992.92	3,459.83	67.08	.....
Amount covered by existing contracts at end of month	.....	.....	.....	.....
	992.92	3,459.83	67.08	.....
Balance available at end of month	45,841.87	4,543.76	10,134.32	.....

[a] Includes $75,000 shown in statement for June 30, 1907, under allotment for Giles Bend.

[b] Balance, $75,000, reported under this allotment June 30, 1907, transferred to allotment for Natchez and Vidalia harbors, Mississippi and Louisiana.

Consolidated statement of condition of appropriations and allotments under Mississippi River Commission on June 30, 1908—Continued.

FOURTH DISTRICT—continued.

	Improving Mississippi River, allotment for—		Expended appropriations.	Grand total.
	Expended allotments.	Total.		
Amount expended on present project to end of last fiscal year	[a] $136,506.99	$9,447,588.52	[b] $2,303,601.30	$11,751,189.
Balance unexpended at end of last fiscal year		1,456,386.18		1,456,386
Amount appropriated or allotted since (net)		262.16		262
		1,456,648.34		1,456,648
Amount expended from beginning of present fiscal year to end of previous month		726,579.46		726,579.46
Amount expended during the month		23,851.99		23,851.99
		750,431.45		750,431.45
Balance unexpended at end of month		706,216.89		706,216.89
In Treasury United States		674,168.97		674,168.97
In hand		32,047.92		32,047.92
		706,216.89		706,216.89
Outstanding liabilities at end of month		11,727.30		11,727.30
Amount covered by existing contracts at end of month		497,406.98		497,406.98
		509,134.28		509,134.28
Balance available at end of month		197,082.61		197,082.61

[a] Preservation of works, $134,000; dredges and dredging, $2,506.99.
[b] Improving harbor at Natchez and Vidalia, Miss. and La., $282,252.04; improving harbor at New Orleans, La., $979,639.86; improving Atchafalaya and Red rivers, Louisiana, $1,001,709.40; emergencies in river and harbor works (Mississippi River at Giles Bend), $40,000.

NOTE.—The allotments made at the one hundred and fifth session of the Mississippi River Commission from the appropriation by sundry civil act of May 27, 1908, will be taken up in the month of July, 1908.

LIST OF APPENDIXES ACCOMPANYING THE ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION, FOR THE FISCAL YEAR ENDING JUNE 30, 1908.

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[a] Six of which are printed. [b] Five of which are printed.

APPENDIX 1.

REPORT OF CAPT. G. R. LUKESH, CORPS OF ENGINEERS, SECRETARY MISSISSIPPI RIVER COMMISSION.

MISSISSIPPI RIVER COMMISSION,
OFFICE OF THE SECRETARY,
St. Louis, Mo., May 31, 1908.

COLONEL: I have the honor to submit the following report of operations under this office for the year ending May 31, 1908.

The works in charge of the Secretary of the Mississippi River Commission have been carried on under allotments made by the Commission from appropriations for improving the Mississippi River between the Head of Passes and the mouth of the Ohio River, and under allotment for fiscal year from permanent appropriation provided by section 9 of the river and harbor act of June 13, 1902, for gauging the waters of the Mississippi River and its tributaries.

The allotments from the first-named appropriation are as follows:

(1) *Mississippi River Commission.*—Available for salaries, clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission.

(2) *Surveys, gauges, and observations.*—Available for survey of the Mississippi River between the Head of Passes and its headwaters, for the establishment and maintenance of gauges, for special surveys and examinations, and for the collection and reduction of physical data pertaining to Mississippi River, and for the maintenance and repair of plant.

(3) *Dredges and dredging.*—Available for the construction, operation, maintenance, and repair of dredging plant for the Mississippi River from Head of Passes to the mouth of the Ohio River.

The allotment from the permanent appropriation for gauging is available for paying salaries of gauge observers and other expenses incident to maintaining gauges at specified places on the Mississippi River and its tributaries.

MISSISSIPPI RIVER COMMISSION.

The Mississippi River Commission held four sessions during the year, as follows:

One hundred-second session, June 24–26, 1907, at St. Louis, Mo.

One hundred-third session, on board the U. S. steamer *Mississippi*, St. Louis, Mo., to New Orleans, La., November 18–26, 1907.

One hundred-fourth session at St. Louis, Mo., February 24, 1908.

One hundred-fifth session on board the U. S. steamer *Mississippi*, St. Louis, Mo., to Head of Passes, La., April 11–20, 1908.

The proceedings of these sessions have been printed and issued.

Plant and outfit.—The steamer *Mississippi* has been in service with the Commission on its inspection trips, and during the remainder of the time was laid up with the dredge fleet at West Memphis, Ark., except when in service with the President of the United States from Keokuk, Iowa, to Memphis, Tenn., when she left the fleet September 21 and returned October 5, 1907. She left the fleet for the fall Commission trip, 1907, on November 10 and returned December 5, 1907. She left for the spring trip, 1908, on April 4 and returned April 27, 1908. While at the fleet repairs were made to the wheel and engines, to the roof, furnace, and boiler flues, and to the electric lighting plant and to other parts of the machinery. The cabin was painted.

SURVEYS, GAUGES, AND OBSERVATIONS.

Survey of the Mississippi River.—This survey, which is authorized by the law creating the Mississippi River Commission, to extend from the Head of Passes to the headwaters of the river, has been made with a view of obtaining accurate data for topographical and hydrographical maps for use in study of the river in connection with planning improvements. The field work has been conducted in accordance with the most approved methods. The instructions to field parties were printed in the reports of the Chief of Engineers for 1891, pages 3474–3485, and 1899, pages 3469–3474. The survey marks are intended to be permanent, in order that they may serve as the basis of future surveys to determine changes in the river. The field work, comprising secondary tri-

angulation, precise levels, topography, and hydrography has been completed over the entire river, a distance of about 2,347 miles. A summary of the survey to 1896 is printed in the Report of the Chief of Engineers for 1896, pages 3574–3576. The progress of the work since that date is given in detail in the successive annual reports.

Resurveys.—In order to ascertain what changes had occurred in the bed of the river since the first general survey, a resurvey of the river between its high-water banks was begun at the mouth of the Arkansas River in October, 1894, and carried to Vicksburg by December, 1894. This resurvey was continued from Vicksburg to Donaldsonville in 1895–96, and from Scotts Bluff to Carrollton in 1897–98. The results of the comparison between this resurvey and the earlier survey are printed in the annual reports of the Chief of Engineers for 1896, pages 3577–3598, and 1897, pages 3672–3686. A similar resurvey from the forts below New Orleans to the Head of Passes was made in 1903–4, and the results are discussed in the supplement to the Annual Report of the Chief of Engineers for 1905, pages 41–45. A similar resurvey was carried in 1902 from Cairo, Ill., to Corona Landing, Tenn. (203), and was completed to the mouth of the Arkansas River in 1904. The results of this survey are now being prepared in the office for comparison with those of the earlier surveys; about 600 cross sections of the river have been platted for this purpose.

On account of certain observed discrepancies in the precise levels on the lower river, the line was rerun from Baton Rouge to the jetties in 1897–98, from Fort Adams (755) to Baton Rouge in 1900, from Fort Adams to Vicksburg (600) in 1905–6, and from Vicksburg to the mouth of White River (393) in 1906–7. No fieldwork was done during the past season, as the assistants engaged on this releveling were engaged on other work under the Board on Examination and Survey of the Mississippi River. It is proposed to extend the work of releveling northward during the coming field season.

WORK DONE DURING THE YEAR.

Precise levels.—The computation of field notes of season of 1906–7 from Vicksburg, Miss. (600), to the mouth of White River, Ark. (393), had been checked only in part by the observers; this checking was completed and the final computations made by the office force; the results have been tabulated ready for printing in pamphlet form, together with the descriptions of the permanent bench marks established on this stretch.

Permanent marks.—Since the earlier surveys of the river below Cairo a large number of permanent marks pertaining thereto have been disturbed or destroyed from various causes, many of them having caved into the river.

The systematic work of restoring these marks and establishing new ones was begun at Cairo in the fall of 1905 by a party in charge of Assistant Engineer Morrow. During that and the following season the work had been carried down to secondary triangulation station Adams, just above Helena, Ark., a distance by river of about 302 miles. In the latter part of September, 1907, preparations were made for beginning fieldwork for the season and the party left Memphis, Tenn., on October 3, 1907, on the quarter boat *Illinois*, in tow of the small steamer *Mars*. The party, in charge of Assistant Engineer A. T. Morrow, consisted of the following: Junior Engineer E. J. Thomas; surveyors, F. C. Hilder, T. B. Perry, A. R. Waters, F. A. Walton; recorders, E. L. Perry and E. B. Nettleton; also 6 survey men, 11 axmen, and the boat's crew of 9 men, including cooks and waiters, making a total of about 54 persons in the outfit.

Work was begun on October 5, 1907, just above Helena, Ark., where the previous season's work had been closed and was continued without interruption until February 15, 1908, when work was closed for the season at secondary triangulation station Wickliffe, about 35 miles below Greenville. The party was then disbanded, some of the men returning by rail from Greenville and the chief of party and others returning with the boats to Memphis. Owing to defective boiler and pump and to high winds the outfit did not arrive at West Memphis, Ark., until February 29, when the boats were laid up.

A system of tertiary triangulation was carried down the river for locating the survey marks. The elevations of marks were determined by duplicate lines of levels from the precise level bench marks, and elevations of all marks below mouth of White River have been referred to the finally adopted mean gulf level at Biloxi, Miss.

About 211 miles of river was covered during the season, 140 old marks were redetermined, 124 new marks were established, and 490 triangles were closed. The total field cost of this work was $11,127.47, or $52.74 per mile of river.

This party also surveyed the caving banks of this stretch of the river under direction of the Board on Examination and Survey of the Mississippi River.

Reduction and platting of field notes of the general survey.—Some work was done platting the notes in vicinity of Lake Bemidji and Itasca Park.

The reduction of notes of the survey for restoration of permanent marks, season of 1906–7, was completed. The reduction of notes of similar work, season of 1907–8, is about 50 per cent completed.

Mapping.—Detail charts Nos. 243 to 250 above Minneapolis, Minn., scale 1:5,000, were completed in part and are nearly ready for the publisher. Charts Nos. 251 to 260 of the same series have been projected and partly drawn.

Map No. 145, inch-to-the-mile series, was completed. Map No. 146 of this series has been partly drawn.

The office force in the drawing division have been for the greater part of the year engaged on work under the Board on Examination and Survey of the Mississippi River.

Published maps and charts.—Inch-to-the-mile maps Nos. 142 to 145, inclusive, were published by this office during the past year; and sheets Nos. 13, 15, 16, 17, 19, and 21 to 25, inclusive, of the same series were corrected and republished.

Detail charts Nos. 234 to 242, inclusive, scale 1:10,000, extending this series above Minneapolis to 2 miles below Split Hand Creek or to 1,186 miles above Cairo, were published during the year.

The map of the lower alluvial valley, in eight sheets, and the map of the St. Francis Basin, in two sheets, were also republished during the year.

The maps and charts published by the Commission are as follows:

A map of the lower alluvial valley of the Mississippi River from the vicinity of Cairo to the Gulf of Mexico, in eight sheets, scale 1 inch: 5 miles, first published in 1887, and a third edition with additional data published in 1908.

Map of the valley of the Mississippi River from Cairo to St. Paul, in four sheets, scale 1 inch: 5 miles, published in 1899.

A district map of the Mississippi River from Cairo to the Gulf, showing improvement and levee districts, in one sheet, scale 1 inch: 5 miles, was published in 1897.

Detail charts, 170 in number (scale 1:20,000), and with 4 index and 2 title sheets, showing hydrography of the river and topography of the territory near the river, from the Gulf to Minneapolis, Minn., a distance of 1,957 miles.

Detail charts, 1:10,000, similar to the above, showing the river from Minneapolis, Minn., to the source of the Mississippi, are in process of compilation. Forty-two sheets have been published, extending the series to 2 miles below Split Hand Creek, Minnesota.

Maps of the Mississippi River, on the scale of 1 inch: 1 mile, from the Gulf of Mexico to 1½ miles above Grand Rapids, Minn., in 77 sheets, with index, title page, and cover, for maps below Cairo, have been published. This series is being extended toward the source of the river.

Map of New Orleans and vicinity, in four sheets, showing Fort Chalmette, similar to the corresponding one of the detail charts described above, but on a scale of 1:10,000; also a map of Lake Itasca, in colors, on a scale of 1:15,000 in one sheet, and a map of the St. Francis Basin, scale ½ inch to 1 mile, in two sheets; the latter republished in 1908 with additional data.

GAUGES.

A general description of the various gauges maintained under direction of this office will be found on page 86 of supplement to the Report of the Chief of Engineers for 1905. No material changes have been made in the gauges during the year. The gauge at Barbre Landing, La., the only gauge of the Commission not previously in charge of the secretary, was transferred from the fourth district officer to the secretary July 1, 1907, under a resolution of the Commission.

The low-water inspection of all the regular and high-water gauges was made from October 9, 1907, to January 29, 1908. The errors found in the gauges were generally less than 0.2 foot, except at Red River Landing, La., and Mhoon Landing, Miss., where settlement of the banks caused maximum errors of 1.4 feet and 0.5 foot, respectively, in certain sections of the gauges; an error of 0.4 foot was

also found in a temporary section of gauge which had been in use for a short time at Columbus. The corrections for these errors in the gauges were fairly well determined from the inspector's leveling and from the office hydrographs, and have been applied to the gauge records before printing. The high-water inspection of gauges was begun in April, and is still in progress. All of the gauges have had the necessary repairs made and also the bulletins repainted where necessary. New steel bulletins of the latest type were erected at Baton Rouge, Plaquemine, College Point, and Barbre Landing, La., and similar bulletins have been shipped to Nashville, Tenn., and Cape Girardeau, Mo., for erection at those stations.

During the low-water season of 1907 the rivers reached only moderately low stages. A remarkable feature of the stage of the Mississippi River above Cairo was its very narrow range; from early in November, 1907, to nearly the end of January, 1908, the extreme range was about 2 feet on the St. Louis gauge.

At none of the 66 stations given in Table No. 1, accompanying this report, was the low water of 1907 as low as the lowest previously recorded. At stations on the main river from Cairo to Red River Landing the average was 10.4 feet above the previous lowest. From Bayou Sara to Fort Jackson the average was 2.87 feet above the lowest known stages.

The present high-water season is remarkable chiefly for the occurrence of four moderate floods in succession at the head of the main valley, the first cresting at Cairo in February and the last in May, all reaching to about 45 feet on the Cairo gauge. The second rise, however, which crested at Cairo on March 18–19 with a reading of 45.55 feet on the Cairo gauge, was the highest of the year thus far.

This is 6.62 feet lower than the highest known stage at Cairo, which occurred in 1883. The stage at Cairo has been above 40 feet for seventy-seven days during the period from February 18 to May 26. This was only surpassed in point of duration by the year 1882, when the stage was above 40 feet for one hundred and five days, including the June rise, however.

The first three rises of this year as they passed down the river found the lower tributaries at quite high stages, and this fact, together with the natural tendency of floods to flatten out in their progress downstream, produced at the lower stations practically one continuous rise; this is clearly shown by the hydrographs on Plate No. 1 herewith. The fourth rise has not yet reached the lower stations, but the flood now prevailing in the Red River will tend to prolong the present high stage below the mouth of that river.

The stage at Carrollton has been above 15 feet since March 14, seventy-nine days; but as the river is now above 17 feet, and is likely to remain above 15 feet well into June, the above number of days will be largely increased.

The greatest number of days in any previous year in which the stage at Carrollton was above 15 feet was eighty-five days in 1903.

Readings on the high-water gauges from Cairo to the Head of the Passes were taken to record the second rise, which was the maximum of the year, from Cairo to Sunflower Landing, Miss., or for about 350 miles below Cairo. For the reasons before stated it is difficult to distinguish the crest of this rise at stations below the mouth of the Red River. The maximum reading of this year on the Carrollton gauge occurred on May 6 and 7, and was 17.9 feet; the highest previous reading occurred in 1903, and was 19.42 feet, or 1.52 feet above the highest of this year thus far at Carrollton.

The tributaries, with the exception of the Cumberland and Tennessee rivers, have all been at comparatively high stages at some time during the present season, the Arkansas and Red Rivers being higher than for some years; the gauge reading at Little Rock on May 30 was 27.8 feet, and at Alexandria was 36.3 feet on that date, with the Red River still rising. The highest previous readings at these stations were 31.2 and 38.25, respectively. High stages on the White and Yazoo rivers have been almost continuous since the latter part of February, but excessively high stages have not been reached on these rivers.

The high-water gauges are now being inspected and the readings which were reported by postal cards verified by the inspectors. Where no readings have been taken the inspectors obtain elevations of high water by leveling to stains or marks left by the water. It is expected that these final records will be completed in time for tabulating and will be given in Table No. 2 accompanying this report.

The highest and lowest readings of all the regular gauges on the Mississippi River and its tributaries for 1907 are given in Table No. 1.

The hydrographs of daily readings at all of these stations for 1906, in four sheets, have been prepared and blueprinted.

The hydrographs of the Mississippi River from Cairo to Fort Jackson, from June 1, 1907, to May 31, 1908, are given in Plate No. 1 accompanying.

The comprehensive hydrograph of the Mississippi River and tributaries, first printed in the report of the Commission for 1900, is being brought up to date.

The tide gauges at Biloxi, Miss., and East Bay, Louisiana, have been maintained throughout the year. Both stations have been inspected at time of regular gauge inspections.

Two new clocks were purchased for Biloxi where the old clocks had not been running well. A new copper float gauge has been made for this station, and a new creosoted wooden box has been made and put in place for the float of the automatic gauge.

The hourly ordinates have been scaled off the tide-rolls of Biloxi and tabulated to March 29, 1908; and the same work has been done for East Bay, Louisiana, to April 8, 1908.

DISCHARGE OBSERVATIONS.

The main river below Cairo reached the prescribed stages for discharge measurements this season at all stations except Columbus, Ky.

Measurements were made at Chicot, Ark., from March 6 to 18, and at Helena, Ark., from March 21 to 31, by a party on the steamer *Search*, in charge of Mr. M. A. Bell, surveyor.

Discharges were measured by a party on the steamer *Mercury*, in charge of Mr. T. B. Perry, surveyor, as follows:

On the Mississippi River, at Red River Landing, and on the Atchafalaya River, at Simmesport, La., from April 1 to 13, and from May 4 to 7.

On the Black River, at Jonesville, La., April 18 to 20; on the Mississippi River, at Vicksburg, from April 25 to 30, and on the Red River, at Alexandria, La., from May 9 to 15.

A second series was begun on May 29, and at the end of the month was still in progress.

A small party in charge of Mr. M. A. Bell, surveyor, sent by rail from Memphis, Tenn., measured the discharge of the Arkansas River at Little Rock, Ark., from April 15 to 17. The observations were made from the Iron Mountain Railroad bridge, with the permission of the owners, as it was not practicable to obtain a steamboat.

A second series is now in progress by the same party.

Two new current meters, known as the Haskell meters, and two of the latest type of registers, all manufactured by E. S. Ritchie & Sons, of Brookline, Mass., were purchased during the year.

All of the current meters were rated at the settling basins of the St. Louis water works. Those used by Mr. Bell's party were also rated at West Memphis, and those used by Mr. Perry's party will be rated at New Orleans, La., when the party reaches that point.

The field notes of all the discharge observations made thus far this season are now being reduced in the office.

No discharge observations were made during the low-water season of 1907 as the river did not fall to the low-water stages prescribed by the commission for this work.

The scientific records, maps, and construction drawings of the Secretary's office have been catalogued and the indexes kept up. Various requests for information and data of the Mississippi River have been complied with.

The following assistants have been engaged in the office work of this division while not on field duty: Mr. E. J. Thomas, junior engineer; Mr. F. E. Early, surveyor, and Messrs. J. G. Frost, F. P. Van Wye, and R. A. Brown, recorders.

This division has remained under the charge of Assistant Engineer Kivas Tully, from whose annual report part of the foregoing has been taken.

PLANT.

The floating plant pertaining to this allotment consists of the steamer *Patrol* and the quarter boat *Illinois*, with a complement of skiffs. The small tender *Mars*, belonging to dredges and dredging, is commonly operated during the field season under this allotment, which also bears its share of the repairs to this boat. During the present high-water season the steamers *Search* and *Mercury*

have also been in service on discharge and gauge-inspection work below Cairo. The steamer *Gen'l. T. L. Casey* has been transferred to this office from the St. Louis engineer district and is being overhauled and extensively repaired. All this plant, when not in field service, has been cared for at West Memphis. An additional boat, specially planned for discharge and gauge-inspection service, is much needed.

Steamer Patrol.—This boat returned to the fleet from gauge inspections on July 11, 1907. She left on September 25 for service under the Board on Examination and Survey of the Mississippi River and is still in that service above Cairo. While at the fleet, repairs were made to the main deck and machinery.

Quarter boat Illinois.—This boat was in the field from October 3, 1907, to February 29, 1908. Some necessary repairs are now being made to this boat and will be completed before the beginning of the coming field season.

DREDGES AND DREDGING.

Project.—On the 20th of June, 1896, the Mississippi River Commission adopted a project for obtaining and maintaining, by means of dredges, a channel in the Mississippi River below Cairo, with a width of 250 feet and a depth of at least 9 feet throughout the year, except when the river is closed by ice. This project provided for the construction and operation of seven hydraulic dredges by the 30th of June, 1900, and for the provisional construction of two others, if found necessary. In June, 1902, the first dredge having become unserviceable, the construction of a tenth dredge was decided upon. This dredge, which, it is thought, embodies all desirable features of the older dredges, as well as certain new features believed to be desirable, was completed during the year and was recently accepted from the contractor.

In order to test the practicability of securing and maintaining a navigable channel below Cairo 14 feet in depth at low water, experimental dredging with this object was authorized in November, 1906, and was carried on to a limited extent during the low-water season of 1907. This experimental dredging will be continued through at least the coming low-water season of 1908.

The building of the dredging plant has formed a very important part of the work of this office, and has involved the preparation of plans and specifications for the dredges themselves, for the necessary large and small tenders, pile sinkers, and other plant. The progress of this work has been described in detail in previous annual reports. Plans for a dredge of greater capacity than any previously built by the Commission are now being prepared in this office.

CONSTRUCTION, ALTERATION, AND REPAIRS OF PLANT.

New dredge.—On April 25, 1905, contract was entered into with The Springfield Boiler and Manufacturing Company, of Springfield, Ill., for the construction of the new dredge to be named *B. M. Harrod.* By the terms of the contract the dredge was required to be ready for delivery by December 7, 1906, but owing to delays in the delivery of material, due in part to a strike in the pipe mills of the Reading Steel Company, the time limit was waived.

This dredge, with its ponton pipe line, completed with the exception of sundry small details, arrived at West Memphis, Ark., on July 5, 1907, under her own steam from Grafton, Ill., where she had been built. The Government tests were subsequently made under working conditions in the field and, after certain adjustments and alterations had been made by the contractor, the dredge was finally accepted by the Government on May 8, 1908.

The other plant pertaining to this allotment comprises the following pieces:

Dredges.—*Beta, Gamma, Delta, Epsilon, Zeta, Iota, Kappa,* and *Henry Flad.*

Steamboats.—*Sachem, Choctaw, Leota, Nokomis, Wynoka, Search, Venus, Vulcan, Mercury,* and *Mars.*

Miscellaneous.—Pile sinkers *Nos. 971, 981, 982, 983,* and *984;* barges *Nos. 041* and *051;* pump boat, 2 calking flats, sectional dock, and a number of skiffs.

This plant was cared for at West Memphis, Ark., when not in the field, and such repairs and alterations as were required to keep it in good condition and increase its efficiency were made.

The steamer *Choctaw* left the dredge fleet on May 1, 1907, with the dredge *Iota* in tow, for Keokuk, Iowa, and returned with the dredge on June 27, after the boats had been docked and the hulls of both sand blasted and painted with gas-house pitch.

The steamer *Lena*, with the dredge *Iota* in tow, left the fleet on June 8, 1907, for Keokuk, Iowa, where the hulls of both boats were sand blasted and painted with gas-house pitch. They returned to the fleet on July 20, 1907.

Pile sinker No. 86 was lent to the Union Sand and Material Company, of Memphis, Tenn., March 15 to 17, 1908.

The dredge *Gamma*, steamers *Nemo* and *Mark*, and Pile sinker No. 88 were transferred to Captain Cullen, Corps of Engineers, U. S. A., for work in the Arkansas River in April and were returned to the fleet on August 8, 1907.

The steamer *Minnesota* was transferred to the first and second districts on July 6, 1907.

The cabin of the dredge *Henry Flagler* was destroyed by fire on the night of January 11, 1908. A new cabin is now being built and the machinery, boilers, and other parts overhauled and repaired.

Coal.—Twenty-three barges, containing 306,143 bushels of coal, were delivered at the coal harbor above Caruthersville, Mo., on September 23, and four barges, containing 53,087 bushels, on November 23 by the Monongahela River Consolidated Coal and Coke Company.

This coal was cared for at the harbor above Caruthersville and delivered to dredges as required during the low-water season.

At the close of dredging operations five barges remained, which were moved to the dredge fleet by the steamer *Stephen*, arriving January 1, 1908.

Subsistence.—All employees were furnished subsistence in kind. During the year 79,223 rations were served at a cost of $0.4721 each, including the wages of cooks, waiters, and all necessary labor in caring for quarters, except that in the months October, 1907, to March, 1908, inclusive, two-thirds of the wages of all waiters has been charged to caring for quarters and has not been included in the cost of rations.

The more important of the repairs made at the fleet are given in detail in the following paragraphs taken largely from the annual report of Assistant Engineer F. H. Hilliard, superintendent of dredging operations.

Dredge Beta.—The boilers were tested by local inspector. The smokestacks, pipe covering, and roofs were painted. The suction pipe was lengthened to dig to a depth of 26 feet and steel teeth and braces were fitted in the suction head. The breeching, pontons, furnaces, electric-light plant, and other parts of boat and machinery were repaired. The casings of the main dredging pumps were removed and the bearing shells were taken out for rebabbitting. The "donkey" boiler was removed from the boat. The main journal boxes of the main pumping engines are being rebabbitted throughout. The alignment of the shaft bearings of the main pumping engines was adjusted. The boring out of the main bearings of the after pumping engine was completed.

Dredge Gamma.—The new stacks, the construction of which was begun in the last year, were completed and erected. The edge plates of the main pump runners were set out to decrease the clearance. Repairs were made to the shop engine and to the furnaces. The plates of the bow and port side of the suction well, which had been badly stove in in a collision with a snag in the Arkansas River, were driven out and repaired.

Dredge Delta.—New liners were fitted in the main pump. Minor repairs were made to the main engines, capstan engines, and siphon pipe. The boilers were tested by local inspector. The condenser piston head and rod were turned up and other repairs were made. The stacks were painted. A new shaft was fitted in the drum of the port winding engine and a new gear wheel was fitted to the brake, and various repairs were made to other parts of the machinery and boat.

Dredge Epsilon.—The boilers were tested by local inspector. Various minor repairs were made to the machinery, boilers, and electric-light plant. This boat was used for quartering dredge-fleet employees part of the year.

Dredge Zeta.—Some repairs were made to the pontons, steam pipe, radiator system, capstan, and jet engines. The boilers were tested by local inspector. The boilers, steam pipe, and boiler covering were painted. The sections of the smokestacks, about 12 feet long, which were taken down to pass under the St. Louis bridges, were recrected. The roof was painted. Some steam and water connections, and other preparations for using this boat as one of the fleet quarter boats, were made. The inside of the stacks was cleaned and oiled. The hull was sand blasted and painted with gas-house pitch. The bottom of the hold under the boilers is being lined with cement mortar.

Dredge Iota.—A new electric light engine was installed. The hull of this boat was sand-blasted and painted with gas-house pitch. The wheelhouses

were remodeled and repaired. The rudders were repaired. A new piston head was procured and machined for the port propelling engine. The boilers were tested. The wheel beams were strengthened and a half-inch filler plate was fitted under the outboard bearing of the port propelling shaft. Extensive repairs were made to the furnaces.

Dredge Kappa.—The interior of the cabin was painted. The boilers were tested by local inspector. Some pipe connections were made. The heads of the feed-water heater were taken off to examine the tubes. The firerooms, stacks, exhaust pipe, roof, machinery, and engine room bulkheads were painted. The paddle wheels were overhauled, tightened up, and repaired. The old wooden nosing was removed and new steel nosing was put on. Since the close of the dredging season this boat has been used as one of the fleet quarter boats. Wires were run to the *Zeta* and connections were made with the lighting system of that boat.

Dredge Henry Flad.—The cabin of this boat was destroyed by fire on the night of January 11, 1908. The deck was cleared and preparations were immediately begun for restoring the damaged parts. This work is now in progress and the lumber has been ordered for rebuilding the cabin. The machinery has been cleaned, oiled, and parts of it put in condition for service. The damaged parts of the stacks and breeching were removed. Parts of the steel frame and smaller piping which were damaged beyond the possibility of further use were removed. The jet pump and condenser were overhauled. The wheels were dismantled and the shafts removed from their bearings. The spud was removed from its well. The main pumping engines were repaired where necessary. The winding engines and main pumping engines were taken apart, new gaskets fitted in the joints, and the journal boxes rebabbitted. The blow-off valves were repaired. The suction hoist was overhauled and the bearings rebabbitted. Such of the iron stanchions as were serviceable were reerected. The safety valves were examined and cleaned. The journal boxes and cross-head brasses of the propelling engines were rebabbitted. The main steam line was taken down, straightened, and reerected. The erection of the auxiliary steam line and boiler-feed line was advanced as far as possible until the cabin stringers are in place. A new set of liners were fitted in the main pump. The pitmans of the propelling engines were straightened. Rivets were cut out for holes for riveting the cabin coaming angles to the deck. The short cylinder timbers were straightened and braced.

The angle irons for securing the cylinder timbers to the deck were straightened and reenforced where broken. The wooden foundations under the small liner pumps were renewed. Some minor repairs were made to the boilers and furnaces.

Wooden nosing was removed preparatory to putting on steel nosing. Some stanchion caps and heel plates were procured and machined. The erection of the cylinder timbers and coaming for the cabin was commenced. The new wheel beams are being erected. If there is no unexpected delay in the receipt of materials this dredge will be ready for service during the coming low-water season.

Dredge B. M. Harrod.—This dredge arrived at the fleet on July 5, and has since been outfitted and tested. The following are some of the changes, adjustments, and repairs that have been made, mainly by the contractor, before the boat was accepted by the Government: The safety valves were removed from the heater and placed in the exhaust pipe of the jet-pumps turbine. A stuffing box was made for the ice machine. The manhole plates of the heater were drilled and tapped and the exhaust pipe fitted in. Holes were drilled for the insertion of a thermometer for ascertaining the temperature of the feed water.

A plate was made for the after end of the spud well to prevent the spud from striking the roof. New couplings were made for the indicator cocks. A shield was made for the main hatch in the engine room. Repairs were made to the feed line. The new low-pressure valves were fitted in the main engines. Additional tie-rods were installed for lessening the vibration of the cabin. Some rudders were made and painted for deflecting the pontons. Some new caps were made for the air-pump valves. The condenser tubes were packed and some ferules were made. The stacks were painted. The jet pumps were tested to determine whether there was sufficient area in the suction-pipe screen. Some repairs were made to the circulating pump and condenser. Some crevices in the main-pump liners were filled with cement.

Steamer Sachem.—The boilers were tested by local inspector. The ice plant was overhauled and repaired. Some repairs were made to the rudder stock

and pitmans. Repairs were made to the breeching and wheel. The ammonia cylinder of the ice machine was bored. The smokestacks were cleaned and oiled on the inside. The old wooden nosing was removed and new steel nosing was put on. Some minor repairs were made to the ice machinery, electric light plant, pipe lines, valves, and other parts.

Steamer Choctaw.—Some repairs were made to the breeching, wheel, capstan engines, heating system, feed pumps. The roof was repaired and painted. Minor repairs were made to the boilers and to the boiler covering. A slight bug in one of the boilers was set up. About 20 new roof stanchions were erected. All of the fire-door frames were renewed and the furnace walls were cleaned and extensively repaired.

Steamer Leota.—Minor repairs were made to the feed pumps, ice plant, and capstan engines. Repairs were made to the boiler covering and water system. The furnaces were repaired. The wheel was overhauled and repaired. The roof and stacks were painted. Repairs were made to the boilers, gauge cocks, and mud valves. Minor repairs were made to the auxiliary steam line, the ice machine, and heating system. The stacks were painted.

The refrigerating plant was overhauled and tested for leaks. The water columns were removed from the boilers, examined, cleaned, and replaced. The ash pan was coated with cement mortar. Fusible plugs were melted and refilled. The safety valves were examined. The boiler covering was repaired.

Steamer Nokomis.—The wheel was overhauled and repaired. "Usudurian" gaskets were fitted in the nozzle joints of the propelling engines. The roof was painted. Extensive repairs were made to the furnaces. The boiler covering was repaired. The stacks were painted and the skylight roof was repaired. The fusible plugs were melted out and rerun. The boilers were tested.

Steamer Wynoka.—Some gauge-cock boxes were made for the boilers. The roof was repaired and painted. Minor repairs were made to the dynamo. Spark arresters were made and fitted in the stacks. The searchlight was overhauled and the wheel was repaired.

Steamer Gen'l. T. L. Casey.—This boat was received by transfer January 23, 1908. A pump was made for pumping out the hold. The furnace was repaired. Repairs were made to the electric wiring, and the lighting system was tested. The "Nigger" engine was overhauled. The propelling engines were tested for alignment. Some new keys were made for the crossheads of the main engines. The house and auxiliary pumps were overhauled. The hot and cold water pumps of the doctor were bored out and valve seats turned up.

The bedplates of the capstan engines were secured in place. Glands were made for the stuffing boxes of the main engines and other repairs were made. An estimate was made for material for completely rewiring this boat. New breeching was constructed. Some castings were procured for the valve seats of the doctor. Minor repairs were made to the heater.

Steamer Search.—The boilers were tested by local inspector. Some new bolts and nuts were made for the low-pressure cylinder heads. Some repairs were made to the furnace, capstan, and ash pan, and the main steam line and other steam pipe in the engine room were painted. The machinery was cleaned and painted, and some of the bulkheads in the engine room were painted. Extensive repairs were made to the wheel. Minor repairs were made to the stacks. Repairs were made to the breeching and exhaust pipe. A small side dock was made for use in repairing the suction pipe of the doctor. The blow-off pipe and the flame bed were repaired. The work of painting this boat was begun.

Steamer Venus.—The boiler was tested by local inspector. A new feed pump was installed and tested. Extensive repairs were made to the wheel. A new stack was built, painted, and erected. Repairs were made to the furnaces. This boat was placed in the dock and the hull was sand blasted and painted with gas-house pitch. A patch was fitted on the hull just aft of the forefoot. The main engines were overhauled. Extensive repairs were made to the cabin. A patch was fitted on the bottom at the after rake, where the bottom plates had been worn by the point of the rudder. The bottom of the hull was given a lining of cement mortar.

Steamer Vulcan.—Some clamps and bolts for the main steam valves were made. Some flanges were made for the steam pipe. A new key was made for the shaft. Some minor repairs were made to the stanchions and braces. The fire pump was taken off of the boat and installed on the *Venus* while the *Venus* was being used as fleet tender. On completion of the repairs to the *Vulcan* the fire pump was replaced on the *Vulcan*. New slide brasses were fitted in the

crossheads of the propelling engines. Some kevels, the doctor, and the wheel were repaired. Some steam pipe was covered and general minor repairs were made. Extensive repairs were made to the fantails, fire pump, pilot house, heating system, and deck. Repairs were made to the safety valve, radiator, and main engine valves, outside bulkheads of the cabin, main-deck guards, furnace and flame bed, main steam line, boiler covering, and blow-off valve. A new ashpan was made and placed in position.

The boat was docked and the hull was scraped and painted with gas-house pitch. A half-inch layer of cement mortar was laid on the bottom throughout the hold. A patch was riveted on the forward part of the hull. The boilers were scaled. The cabin was painted inside and out. A number of new stationary fenders were erected. An I-beam spreader was erected between the cylinder timbers aft of the wheel. The bottom of the ashpan was given a coating of cement mortar. A new stack was constructed, painted, and erected. The roof was painted.

Steamer Mercury.—The boiler was tested by local inspector. Some painting was done and a new feed pump was installed and tested. Repairs were made to the main deck, wheel, and capstan. A new stack was constructed, painted, and erected. The cylinder cocks were repaired. Some minor repairs were made to the furnace.

Steamer Mars.—A new boiler feed pump was installed and tested. A new crosshead was made for the boiler feed pump. The capstan engine was repaired. The snowden heater was repaired. Some repairs were made to the furnace, deck pump, exhaust pipe, and rudders, piston rod of the port propelling engine, cam rods, nosing, main steam pipe, and guards. A cracked sheet was removed from the boiler to be replaced by a new one. This boat was placed in the dry dock and thoroughly overhauled. The hull was sandblasted and painted with gas-house pitch. The hold was cleaned and about one-half inch of cement mortar was laid in the bottom. The pipe casings for the rudder stocks were renewed. The cabin was painted. The main journal brasses were adjusted. The rudders and rudder stocks were repaired. A splash bulkhead of corrugated sheet iron was erected.

Pile sinkers Nos. 971, 981, 982, 983, and 984.—General repairs were made to these boats, boilers and machinery and roofs and stacks painted where necessary. The boilers were tested.

Docks.—Four sections were repaired, calked, and otherwise prepared for service.

Pump boat.—Siphon nozzle, feed pump, and roof were repaired. The valves of the suction pipe of the feed pump were repaired.

Tools and appliances.—Various machine, blacksmith, and other tools were made and others repaired. Minor repairs were made to the combination power punch and shears. A steady rest was made for the large lathe in the machine shop and a small crane was fitted up for this lathe. The drill press was repaired. A mandrel was made for tin scupper work. Some minor repairs were made to the large lathe. A number of barrel buoys were painted and otherwise prepared for use. Some repairs were made to the steam hammer in the blacksmith shop.

Some coal boxes were made. Some nipples were cut for siphon connections. A roller trestle was made for the woodworking shop. The air compressor was erected in the boiler shop. Some minor repairs were made to the planer of the woodworking shop. Some sets and dies were made for use with the air compressor. A lever for the combination power punch and shear was forged. A tap was made for tapping the valve chambers of the large tenders for new valve seats.

The items of repair work which have not been specifically noted above, but whose aggregate cost amounts to at least 25 per cent of the total amount chargeable to repairs, are:

Laying up machinery and draining all pipes, etc., at conclusion of the dredging season; cleaning, polishing, and otherwise preparing machinery for service at the beginning of the dredging season; examining pipe work and making renewals where necessary; removing and examining all nipples, plugs, and fittings directly connected to boilers; renewing decayed wood in cabins, decks, etc., as it appears; repairing roofs, scuppers, railings, stoves, etc.; fitting new gaskets in pipe and machine flanges; grinding valves, and numerous other minor items which are necessary in maintaining the hulls, cabins, and machinery in serviceable condition.

BUILDINGS AND SHOPS.

Boiler shop.—The construction of this building was completed and two coats of paint were applied. A concrete foundation was built for the bending rolls and the rolls were placed and bolted down. The shafting was connected with the line shaft of the woodworking shop. The countershaft for the boiler plate roll was erected and the bearing was fitted up. A concrete foundation was built for the combination power punch and shears and this machine was moved from the machine shop to the boiler shop. A crane was erected for handling heavy plates.

Material warehouse.—This building was painted.

Woodworking shop.—A brick pit was dipped for the engine. The shafting was lined up. The machinery was stripped up and some minor repairs were made. A heating system was installed.

Machine shop.—This building was painted.

Property warehouse.—The lumber for this house was unloaded from the cars, transferred to the dredge fleet, and the construction of the building completed. Some shelves and brackets were erected for storing property.

Survey, gages, and electrical record house.—This house was moved, repaired, and painted.

Boiler house.—A concrete foundation for the boilers and a retaining wall were built. The boiler front, frame bed, and ash pan were made and placed. A steel roof frame was made and temporary siding of sheet iron was bolted on. The two old boilers from the steamer *Pine* were installed in this house. A section of discharge pipe, which belonged to the dredge *Alpha*, was set on end and makes an excellent smokestack. A breeching was constructed, connecting the boiler flues with the stack.

Marine ways.—Some borings were made to determine the character of the soil encountered at the dredge depot with a view to determining the character of foundation required.

Dressed lumber storehouse.—The old carpenter shop was moved, repaired, and converted into a storeroom for dressed lumber and for oil.

Dredges and dredging record house.—This building was moved and painted. Some window lights were put in. The shelving was remodeled, and a case for filing maps was made.

Quarter boat No. 13.—The hull was cut away and replaced by foundation posts. The cabin was painted, and some repairs were made.

Water tank.—A water tank having a capacity of 11,000 gallons was constructed, painted, and connected with the water line.

The foundation for the derrick engine was moved and the hoist was repaired. Some repairs were made to the suction pipe leading from the artesian well. A temporary fire-service line was installed. The grounds were cleaned of rubbish. The foundation posts under all buildings were painted. Some old arc lights were repaired to be used in lighting the grounds. All property and material subject to damage by water was raised above high-water mark.

DREDGING OPERATIONS ON THE LOWER MISSISSIPPI RIVER, BETWEEN CAIRO, ILL., AND THE HEAD OF PASSES.

A statement of the general principles which have governed the conduct of dredging operations may be found in previous reports of this office.

During the low-water season of 1907 five dredges, the *Beta*, the *Iota*, the *Lappa*, the *Henry Flad*, and the *B. M. Harrod*, were operated on five bars from Point Pleasant (82) to Daisy (252). Two other dredges, the *Epsilon* and *Theta*, were in commission during parts of November and December, but no work was required of them.

Three survey parties were in the field, and surveys were made of all bars where trouble was expected.

These surveys served to determine the areas of shoal water and to enable the channels to be intelligently located. Numerous surveys were also made of those bars where dredging was done to observe the effect of the dredging. Frequent inspections were made of that part of the river where shoals are known to exist, and all crossings sounded. Information was given to pilots and others interested in the navigation of the river, and buoys and other marks showing the location of the channel were placed where required.

The river stages during the low-water season are shown on the annual hydrograph Plate 1 herewith. It will be noticed that only moderately low stages were reached during the season.

The first trip of inspection was made August 19 to 21, and covered the river between Cairo, Ill., and Memphis, Tenn. On this trip it was found that there were four bars that would require dredging at a moderately low stage. These were: Linda (82), Joe Eckles (92), Island 35 (193), and Corona (204).

At Linda the filling up, as the river fell, of the chute behind, or to the left of Bixbys towhead by natural agents, caused the whole volume of the river to flow through the Linda Crossing. Natural erosion resulted which greatly improved the conditions at this point, so that very little dredging was required for the maintenance of a 14-foot channel.

At Island 35 Crossing the conditions were exactly reversed. At the commencement of the low-water season, nearly all of the water was flowing over this crossing and then down the shore of the island and back over Pecan Point Crossing to Pecan Point, only a small proportion being diverted down the Arkansas shore past Uzzells. As the season advanced, however, the channel through Uzzells bar improved and the Island 35 channel deteriorated until at one time there was very little to choose between the two. The effective work of the *Henry Flad*, distributed through the season, maintained an excellent channel through Island 35 Crossing. The length of the channel requiring dredging was 3,500 feet.

Corona Crossing was the first to require dredging. The new dredge *B. M. Harrod*, which had been delivered at the dredge fleet in July, by the Springfield Boiler and Manufacturing Company, commenced work on this crossing on September 13. On account of the frequent fluctuations in the stage and the peculiar features of this bar, a great amount of dredging was required throughout the low-water season.

Only two crossings below Memphis required dredging for the maintenance of the 9-foot project. These were Horn Lake (245) and Daisy (252). Excellent results were obtained at both of these places with the dredge *Iota*.

In accordance with plans of the Commission experimental dredging, having for its object the determination of the feasibility of maintaining 14-foot channels, 250 feet in width through shoal crossings, was carried on at three crossings, Linda, Island 35, and Corona.

The *Beta*, *Kappa*, and *Henry Flad* were used in this work. A detailed report of these experiments has already been submitted. In the tables accompanying the present report, the work done in connection with the 14-foot experiments has not been separated from that required for the 9-foot project.

Dredge Beta.—Was moved out on the bar opposite the dredge depot and placed in commission on October 12. This dredge, with pile sinker *No. 981*, pontons, and coal barge in tow of the steamer *Sachem*, left for Corona Crossing at 6.30 a. m. on the 15th and arrived at Corona at 11 a m. on the 16th.

Placing plant and preparations for dredging were commenced at 11 a. m. on the 16th. The boilers were fired, but the after starboard boiler developed bad leaks in three of the tubes, and it was necessary to cool this boiler down. Some manhole gaskets blew out of the forward boilers, necessitating cooling these down also. New tubes and gaskets were fitted in.

Dredging was commenced on the 18th, using only three boilers on account of the leaky tubes in the after starboard boiler, which had not been repaired at this time. The pumps were run slowly for some time to give an opportunity to take the slack out of the bearings, etc. On account of the entire crew having been engaged on repairs for twelve consecutive hours, dredging was suspended at 6 p. m. and not resumed until the next morning. This dredge was operated only twelve hours of each day until the 20th, and several days after this date dredging had to be suspended for a part of the day on account of not having a full crew of dredge hands and stokers.

Four cuts were completed through the lower end of the crossing with the suction lowered to a depth of 20 feet, with the exception of a part of the fourth cut, where the suction was lowered to 25 feet.

On completion of the fourth cut the piles were shifted ahead about 1,000 feet, when work on the upper end was commenced. Nine cuts were made through the upper part of this crossing, on the completion of which the dredge was again moved down to widen out the lower end. At the commencement of this work the current was very sluggish, but increased as the work progressed, until at its conclusion a high velocity was attained.

Dredging was continued with slight interruptions until midnight on November 3, when it was necessary to move the dredge out of the channel to clean boilers and make a number of minor repairs. The work projected had been completed,

although had the dredge been in condition for further work, a deep cut would have been made through the full length covered by previous operations.

This dredge lay at anchor below the channel until the 12th. On this date preparations to resume operations were made, when all of the firemen and ash haulers quit work. This rendered dredging impossible until the 19th, when new men had been secured. Dredging was commenced on this date and continued until the 21st, when the dredge was moved out of the channel and a survey was made.

The object of this work was to widen the lower side of the channel and to remove a ridge which previous operations had failed to reach.

Dredging was again resumed on November 25 and continued until December 3. On account of the cross current considerable difficulty was experienced in manipulating the dredge while engaged on this work.

On November 26 the towboat *Reaper*, belonging to the West Kentucky Coal Company, with several barges of coal in tow, disregarding the signals of the *Beta*, ran to the right of the head piles and then crossed the cables, going down to the left of the dredge. She grounded on a lump just below the dredge and swung down onto the pontons, doing considerable damage to the channel bar connections and slipping off the rubber sleeves of a number of sections of the discharge pipe.

On account of not having a sufficient number of stokers it was impossible to operate the dredge the full twenty-four hours on the 28th, 29th, and 30th. Considerable trouble was experienced in maintaining a full crew of stokers and dredge hands for this boat.

Dredging was discontinued on December 3, on account of the rapidly rising stage. On completion of the work there was a channel of the projected width, 15 feet in depth.

Instructions were given to resume dredging on December 9. When steam was raised, however, a leaky tube was found in the after starboard boiler, and the gaskets in the man heads of the port after boiler were blown out. These boilers were cooled down and the tube and gaskets were replaced by new ones. Dredging was commenced at 4.30 p. m. on the 10th, the object being to cut out a shoal lump between the two channels. Work was continued until 12.35 p. m. on the 23d, when the dredge was moved out of the channel, the work as projected having been completed.

This dredge was ordered in to the fleet on December 26 and arrived there at 4 p. m. on the 27th.

Dredge Epsilon.—This dredge was moved out on the bar opposite the dredge depot and placed in commission on November 4 and left the fleet for Joe Eckles Crossing in tow of the steamer *Wynoka* on the 8th.

At 1 p. m. on the 12th the flange on the gland of the port main engine of the *Wynoka* broke, and it was necessary to tie up for repairs. Repairs were completed and she proceeded up the river at 6 a. m. on the 13th. On arrival at the coal fleet, above Caruthersville, Mo., at 1 p. m. on this date, the steamer *Wynoka*, tender to the dredge *Epsilon*, was sent to tow a barge of coal to the dredge *Kappa*, lying at Linda Landing, Mo. The *Wynoka* returned at 2.30 p. m. on the 14th. The dredge, coal barge, pile sinker, and pontons were taken in tow and moved to Gayoso, arriving there at 4.30 p. m. on the 14th.

On account of the rising river this dredge and other plant were tied up at the bank at this point as it was a much better harbor than Joe Eckles. She lay at Gayoso, awaiting a lower stage, until December 21, when she was ordered in to the dredge fleet. She arrived there at 2 p. m. on the 22d. No work was required of this dredge.

Dredge Zeta.—This dredge was moved out on the bar opposite the dredge depot and placed in commission on November 4, where she remained, awaiting a lower stage of water, until the 22d when she was moved back into the fleet and laid up. No work was required of this dredge.

Dredge Iota.—Was moved out on the bar opposite the dredge depot and placed in commission September 26 and remained there awaiting a lower stage until October 26 when she left for Horn Lake, to dredge a channel through the crossing at that point. Dredging was commenced on the 28th and continued until the 30th. Six cuts were made, increasing the depth from 11½ feet to 14 feet.

This dredge lay at the bank at Horn Lake until 7.30 a. m. on November 3, when she left for Daisy Crossing, with instructions to begin dredging upon arrival at that place. Work was begun on this crossing at 2 p. m. on this date,

work was completed on October 5 and the dredge was moved to the ba
tied up.

This dredge was again moved out on Linda Crossing and commence
on the 29th, with the object of increasing the depth to 14 feet. This w
completed on the 30th, when a channel fulfilling the requirements of the
project had been obtained.

When it was indicated that dredging would be required at Joe Eckle
ing, this dredge left Linda at 2.30 p. m. on November 1. After stop
Tiptonville from 3.30 p. m. on the 1st until 12.45 p. m. on the 3d to cle
ers, she arrived at Joe Eckles on the 3d.

Since the river had begun to rise when the *Kappa* arrived at this cros
dredging was required, and, after lying at the bank till 12.45 p. m. Nove
she started for Linda Landing with instructions to maintain a 14-foot
in the crossing at that place. She arrived at Linda the same day.

This dredge lay at the bank at Linda Landing until the 11th, when d
on the Linda Crossing for the maintenance of the 14-foot project w
menced. The work was continued with minor interruptions until th
when the dredge was moved to the bank.

Since there was but little work to be done at this point, the dredge w
worked twelve hours each day to avoid the necessity of employing s
laborers and stokers to complete the double crew.

This dredge departed from Linda at 7.30 a. m. on December 27 for We
phis, Ark., to go into winter quarters, and arrived there at 3 p. m. on the

Dredge Henry Flad.—This dredge was moved out on the bar oppo
dredge depot and placed in commission on September 20. With pont
coal barge in tow, left for Corona Crossing at 8.45 a. m. on the 21st and
at Corona 9.35 a. m. on the 22d.

Dredging was commenced on Corona at 9.35 a. m. on the 23d to comp
work commenced by the *B. M Harrod.* Fourteen cuts were made, and t
was completed on the 30th, when the boat left for Island 35 Crossing.

Dredging was commenced on Island 35 Crossing on October 2 and co
until the 5th, when the work was completed. Ten cuts were made,
average depth of $5\frac{8}{10}$ feet. The depth in the crossing was increased
to 14 feet.

This dredge commenced work on the 14-foot experimental dredging in
35 Crossing, on October 18, and continued till the 25th, when a channel
the requirements of the 14-foot project was obtained.

On account of the rapid fall of the stage the *Henry Flad* was m
Corona Crossing October 25 to maintain a navigable channel there for
boats, while the *Beta* worked on the 14-foot experimental channel. Thr
low cuts were made, when it was necessary for the dredge to move ou
channel on the 26th, in order to allow a coal tow to pass. This boat
Pecan Point November 2 and arrived there the same day.

On completion of the work in Island 35 Crossing, on November 24, th
16 feet in the channel dredged, and 14 feet above the limits of the dredg
On completion of the work at Corona, there was 11 feet in the a
channel.

When the dredge was moved from Corona to Pecan Point, on Novem
was thought that dredging would be required at that point. An exan
of a map made from a survey on the previous day showed that dredgin
not be required until either the *Epsilon* or *Zeta* could be moved from the
fleet to this crossing. The *Henry Flad* was, therefore, ordered to Is
Crossing to resume maintenance of the 14-foot channel there. She lef
Point on the 3d and arrived at Island 35 on the same day.

Dredging was commenced on the upper part of Island 35 Crossing at 2:15 p. m. on the 3d of November, and continued until midnight on the 8th, when the dredge was moved to the bank at Dago Landing.

On completion of the work on this crossing there was a channel 14½ feet deep and 200 feet wide at its narrowest point. This narrow part of the channel was only about 200 feet long near the lower end of the crossing.

The dredge lay at the bank at Dago Landing until the 12th, when dredging on Island 35 Crossing was again commenced, the purpose being to deepen and widen the existing channel. This work was completed on the 17th and the dredge removed to the bank at Dago Landing. On completion of the work there was a dredged channel 17 feet in depth and of the projected width, 5,600 feet long.

This dredge lay at the bank at Dago Landing until 7.40 a. m. on December 27, when she departed for the dredge fleet at West Memphis, Ark., arriving there at 12.30 p. m. on the same day.

A summary of the work of the dredges during the season is given in table 5, accompanying.

Surveys.—The steamers *Venus*, *Vulcan*, and *Mercury* were used for making surveys in connection with dredging operations. The *Venus* party covered the stretch of river from Linda south to Carrollsville. The *Vulcan* party, Island 35 to Corona, and the *Mercury* party from Memphis to Montezuma.

Inspection.—The steamer *Search* was used as an inspection boat by the secretary and by the superintendent of dredging in examining into the condition of the channels and directing the work of the dredges and steamboats. The office of the superintendent was also maintained on this boat during the dredging season.

Thirty-four trips of inspection were made during the low-water season as follows: One trip Memphis to Cairo, 1 trip Toneys to Memphis, 15 trips Linda to Memphis, 2 trips Joe Eckles to Memphis, 4 trips Island 35 to Memphis, 3 trips Corona to Memphis, 1 trip Horn Lake to Memphis, 3 trips Daisy to Memphis, 1 trip Andersons to Memphis, 1 trip Greenville to Memphis, 2 trips Daisy to Linda.

Channels not less than 9 feet in depth and of widths exceeding 250 feet were maintained through all bars during the year. This work has been in charge of Assistant Engineer F. H. Hilliard, superintendent of dredging, from whose annual report the foregoing has been largely taken.

Based upon the usual suppositions that the width of each cut is the width of the suction mouth of dredge, and that the side slopes of the channel are 1 on 2½, the amount of material moved by the dredges during the season of 1907 was 1,151,739 cubic yards, part of which is chargeable to the 14-foot experimental dredging. In 1906 this yardage was 297,300; in 1905, 197,847; in 1904, 2,149,734; in 1903, 891,098; in 1902, 813,380; in 1901, 1,666,465; in 1900, 1,145,558, and in 1899, 1,612,223.

A statement of the cost of dredging operations from May 1, 1907, to April 30, 1908, is given in Table No. 3, and the depths over shoal crossings during the low-water season, as found by the inspection party of the *Search*, are given in Table No. 4.

SURVEY FOR 14-FOOT WATERWAY, MISSISSIPPI RIVER, FROM THE MOUTH OF THE ILLINOIS RIVER TO ST. LOUIS, MO.

No work was done under this appropriation during the year.

The following papers accompany this report:

Money statements.

Abstract of contracts in force.

Commercial statistics.

Statement of charts issued and sold.

Appendix 1 A. Laws affecting the Mississippi River Commission, July 1, 1907, to June 30, 1908.

Table 1. Highest and lowest gauge readings in 1907, Mississippi River and tributaries.

Table 2. High-water gauge readings, Mississippi River, 1908.

Table 3. Cost of dredging operations, May 1, 1907, to April 30, 1908.

Table 4. Depths over shoal crossings, Mississippi River, low-water season of 1907.

Table 5. Summary of dredging operations, Mississippi River, below Cairo, during the low-water season of 1907.

Plate 1. Hydrograph of Mississippi River, Cairo, Ill., to Fort Jackson, I June 1, 1907, to May 31, 1908.

Respectfully submitted.

G. R. LUKESH,
Captain, Corps of Engineers,
Secretary Mississippi River Commission

Col. WM. H. BIXBY,
Corps of Engineers, U. S. Army,
President Mississippi River Commission.

MONEY STATEMENTS.

Appropriation for improving Mississippi River.

July 1, 1907, balance unexpended		[a] $531,555
Amounts allotted from appropriation by river and harbor act approved March 2, 1907, as follows:		
Mississippi River Commission	$7,000.00	
Surveys, gauges, and observations	10,000.00	
Dredges and dredging	60,000.00	
Amounts received from sales of engineer property under the provisions of section 5 of river and harbor act of June 13, 1902, credited to following allotments: "Mississippi River Commission" ($1), "Surveys, gauges, and observations" ($2)	3.00	
Amounts transferred from allotments in charge of first and second districts officer in payment for purchases of coal, credited to allotment for "Dredges and dredging" in the months named:		
September, 1907	1,631.39	
November, 1907	3,141.57	
December, 1907	2,009.16	
April, 1908	2,671.74	
		86,456.
		618,012.
June 30, 1908, amount expended during fiscal year		388,540.
July 1, 1908, balance unexpended		229,471.
July 1, 1908, outstanding liabilities	32,471.39	
July 1, 1908, amount covered by uncompleted contracts	47,025.00	
		79,496.
July 1, 1908, balance available		149,975.

Appropriation for gauging waters of the Mississippi River and its tributarie

July 1, 1907, balance unexpended		$2,900.
Amount allotted by Chief of Engineers, July 24, 1907, from permanent annual appropriation made by section 6 of river and harbor act of August 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902		9,100.
		12,000.
June 30, 1908, amount expended during fiscal year	$8,609.26	
June 30, 1908, amount reverted to Treasury during fiscal year	720.66	
		9,329.
July 1, 1908, balance unexpended		2,670.

[a] The amount, $531,554.61, reported in Annual Report for 1907, has been creased 65 cents refundment, in November, 1907, of overpayment.

[b] The custody and care of the gauges maintained under this appropriat were assumed by the Mississippi River Commission February 11, 1901, on wh date they were transferred to the secretary, under authority of Secretary War, dated January 25, 1901.

ly 1, 1908, outstanding liabilities	$1,284.91
ly 1, 1908, balance available	1,385.69
nount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908	9,100.00

:mized statement of expenditures during the fiscal year ending June 30, 1908, submitted in compliance with requirement of section 6 of river and harbor act of August 11, 1888.

›servations:		
Pay of permanent gauge observers		$3,595.00
spections and repairs:		
Inspection of gauges on Mississippi River by junior engineers and parties on steamers	$1,817.60	
Inspection of gauges on tributaries	290.60	
Renewals and repairs of gauges and bulletins	140.42	
		2,248.62
›struments:		
Purchase of new instruments		163.50
fice expenses and contingencies:		
Pay of assistant and junior engineers, recorders, and clerks	2,172.19	
Stationery, printing, office rent, etc	429.95	
		2,602.14
		8,609.26

›NSOLIDATED STATEMENT OF APPROPRIATIONS EXPENDED UNDER THE SECRETARY, MISSISSIPPI RIVER COMMISSION, TO JUNE 30, 1908.

Ppropriation for gauging waters of the Mississippi River and its tributaries.

llotments from general appropriations for examinations, surveys, and contingencies of rivers and harbors by acts of—	
March 3, 1871	$5,000.00
June 10, 1872	5,000.00
March 3, 1873	5,000.00
June 23, 1874	5,000.00
March 3, 1875	5,000.00
Pecific appropriations by river and harbor acts of—	
August 14, 1876	5,000.00
June 18, 1878	5,000.00
March 3, 1879	5,000.00
June 14, 1880	5,000.00
March 3, 1881	5,000.00
August 2, 1882	5,000.00
›eficiency act of March 12, 1884	2,100.00
Pecific appropriations by river and harbor acts of—	
July 5, 1884	5,000.00
August 5, 1886	5,000.00
llotted from specific appropriation by river and harbor act of August 11, 1888	8,700.00
›eficiency act of October 19, 1888	3,600.00
llotments from permanent indefinite appropriation made by section 6 of river and harbor act of August 11, 1888, for fiscal years, viz:	
1890	9,000.00
1891 (less $3,518.34 withheld in United States Treasury under ruling that only $6,000 can be expended each fiscal year)	5,181.66
1892	5,100.00
1893	5,500.00
1894	5,500.00
1895	5,500.00
1896	5,500.00
1897	5,500.00
1898	5,500.00
1899	6,000.00
1900	5,500.00
1901	6,000.00
1902	6,000.00

Allotments from permanent annual appropriation made by section 6 of river and harbor act of August 11, 1888, as amended by section 9 of river and harbor act of June 13, 1902, for fiscal years, viz:	
1903	$9,10
1904	9,10
1905	9,10
1906	9,10
1907	9,10
1908	9,10
Total	209,78

EXPENDED.

	To June 30, 1907.	During year ending June 30, 1908.	Total
Expenditures	$186,946.22	$8,609.26	$195,
Unexpended balances reverted to Treasury	10,834.92	720.66	11,
Total	197,781.14	9,329.92	207,
Unexpended balance June 30, 1908			2,
Total appropriated, etc			209,

Appropriation for waterway from Lockport, Ill., to St. Louis, Mo.

Act of June 13, 1902 (river and harbor)	$25,00
Amount transferred from allotment for "Survey of Illinois and Des Plaines rivers, Illinois," as reimbursement	1,09
Total	26,09

EXPENDED.

	To June 30, 1907.	During year ending June 30, 1908.	Tota
Expenditures	$22,291.23		$22,
Unexpended balance reverting to Treasury			a3,
Total appropriated, etc			26,

a Less $6.50 outstanding liabilities (unclaimed wages).

Abstract of contracts in force June 30, 1908—Improving Mississippi R
Mississippi River Commission, secretary's office.

Contractor.	Amount and character of work.	Price.	Date of contract.	Date of approval.	Date of beginning work.	D e t
			1908.		1908.	1
West Kentucky Coal Co.	Furnishing 475,000 bushels coal, per bushel.	$0.09 3/10	June 5	June 29, 1908	June 29	Ju
Charles H. Organ	Water front privileges, per annum.	150.00	June 20	Emergency contract.	July 1	
Matthew C. Williams	do	100.00	do	do	do	
West End Realty Co.	Lease of office rooms, per annum.	5,620.00	do	do	do	

COMMERCIAL STATISTICS FOR CALENDAR YEAR 1907.

TABLE No. 1.

Tonnage between—	Number of passengers.	Receipts and shipments in tons.					
		Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
St. Louis and Cairo	45,808	19,522	1,522	260	11,075	166,360	25,179
Cairo and Memphis	43,041	5,771	11,906	9,276	.....	1,051,154	183,036
Memphis and Vicksburg	122,244	21,937	37,845	24,206	7,584	871,034	157,930
Vicksburg and New Orleans	81,116	31,532	38,262	75,242	2,834	850,200	45,764

Tonnage between—	Receipts and shipments in tons.						
	Logs.	Iron, steel, and metals.	Groceries and provisions.	Stone, gravel, and sand.	Oil.	Unclassified and miscellaneous.	Total.
St. Louis and Cairo	49,175	739	2,100	1,000	.....	55,025	332,267
Cairo and Memphis	464,989	28,422	2,537	15,200	.....	85,496	1,875,746
Memphis and Vicksburg	373,695	22,278	27,646	72,660	4,284	40,857	1,661,406
Vicksburg and New Orleans	167,607	16,235	60,042	926,445	219,075	154,039	2,585,277

NOTE.—Each stretch is treated as a separate river, and tonnage carried between ports on different stretches will appear in the statistics of all intervening stretches. Consequently the sum of the tonnage carried in the four stretches does not represent the total traffic on the river as a whole.

TABLE No. 2.—*Receipts and shipments at principal ports.*

Port.	Passengers carried in and out of port.	Receipts and shipments in tons.					
		Grain and its products.	Cotton.	Cotton-seed and its products.	Live stock.	Coal and coke.	Lumber.
St. Louis, Mo	a 569,962	22,086	1,949	1,294	11,824	196,360	25,101
Memphis, Tenn	100,651	13,154	33,369	14,983	3,478	225,836	26,177
Vicksburg, Miss.b	33,494	4,976	3,215	35,878	568	24,890	7,495
New Orleans, La.c	31,400	519,533	573,932	244,906	6,955	774,560	804,296

Port.	Receipts and shipments in tons.						
	Logs.	Iron, steel, and metals.	Groceries and provisions.	Oil.	Stone, gravel, and sand.	Unclassified and miscellaneous.	Total.
St. Louis, Mo	41,495	1,296	22,001	.....	.....	73,604	368,075
Memphis, Tenn	215,575	12,182	12,474	3,677	11,000	53,174	625,618
Vicksburg, Miss.b	60,000	5,077	3,124	68	100,000	12,800	277,040
New Orleans, La.c	80,000	101,823	964,754	262,273	36,000	738,983	5,120,615

a Includes 464,259 passengers in local excursion traffic.
b The traffic with the Yazoo River and its tributaries not included.
c Includes exports and imports and the domestic coastwise traffic as far as reported.

TABLE No. 3.—*Seagoing traffic at New Orleans, La.*

Arrivals and departures.	Number.	Tonnage.
Foreign-bound vessels	2,203	4,103,325
Coastwise vessels	556	1,422,328
Total	2,759	5,525,653

Receipts and shipments:	Tons.
Grain and its products	490,931
Cotton	549,124
Cotton seed and its products	220,255
Live stock	6,351
Coal and coke	18,327
Lumber	778,909
Iron, steel, and metals	86,772
Groceries and provisions	91,138
Oils	152,780
Miscellaneous and unclassified	640,854
Total	3,855,441

TABLE No. 4.—*Ferry traffic.*

Location of ferries and transfers.	Number of passengers.	Tonnage of freight carried.					
		Grain and its products.	Cotton.	Cotton seed and its products.	Live stock.	Coal and coke.	Lumber.
At St. Louis, Mo.	1,204,404	952,128	44,834	20	9,516	2,798,591	574,996
At Chester, Ill; Cape Girardeau, Mo., and Commerce, Mo	53,870	1,165	.....	.....	37,144	500	56
At Cairo, Ill., to Birds Point, Mo.; Wickliffe, Ky., and Greenville, Mo.; at Belmont, Mo., to Columbus, Ky.; at Hales Point, Tenn., to Wrights Point, Ark.	116,511	111,800	346	1,921	3,397	15,152	158,909
At Memphis, Tenn., to Hopefield and Mound City, Ark.	120,230	30,695	14,700	3,660	6,880	11,610	28,060
At Helena, Ark.; Arkansas City, Ark.; and Ashport, Tenn	63,739	6,255	5,457	2,376	490	24,225	14,302
At Vicksburg, Miss., to Delta Point, La	87,564	6,168	.....	245	462	31,274	8,641
At Natchez, Miss.; Baton Rouge, La., and Donaldsonville, La	309,084	15,243	5,393	60	1,482	4,283	4,001
At New Orleans, La	4,009,282	404,107	140,864	167,841	11,860	227,455	407,126

Location of ferries and transfers.	Tonnage of freight carried.						
	Logs.	Iron, steel, and metals.	Groceries and provisions.	Oil.	Stone, gravel, and sand.	Miscellaneous and unclassified.	Total
At St. Louis, Mo.	6,151	475,837	8,640	20,944	1,010,863	3,032,870	8,935,[illegible]
At Chester, Ill.; Cape Girardeau, Mo., and Commerce, Mo	200	60	1,185	.....	1,100	2,300	43,[illegible]
At Cairo, Ill., to Birds Point, Mo.; Wickliffe, Ky., and Greenville, Mo.; at Belmont, Mo., to Columbus, Ky.; at Hales Point, Tenn., to Wrights Point, Ark.	87,376	10,099	27,963	168	776	113,699	531,[illegible]
At Memphis, Tenn., to Hopefield and Mound City, Ark.	2,730	5,355	20,475	11,940	429,027	87,710	652,[illegible]
At Helena, Ark.; Arkansas City, Ark., and Ashport, Tenn	122	443	9,842	1,067	.....	10,753	75,[illegible]
At Vicksburg, Miss., to Delta Point, La	.....	22,865	1,071	1,411	1,147	439,749	513,[illegible]
At Natchez, Miss.; Baton Rouge, La., and Donaldsonville, La	.....	143	950	.....	.....	25,712	57,[illegible]
At New Orleans, La	.....	118,493	179,875	49,421	21,998	1,469,342	3,198,[illegible]

NOTE.—Owing to deficiency and inaccessibility of records of some transportation companies, considerable tonnage, which should appear under classified heads above, has been included with "Miscellaneous and unclassified."

nt of charts and maps issued and sold from July 1, 1907, to June 30, -Improving Mississippi River, Mississippi River Commission, secretary's

Description.	Free.	Sold.	Total.
ıvial valley map	93	25	118
ıvial valley map	48	58	106
ile map	1,809	1,248	3,057
ırt, 1:20,000 scale	1,151	443	1,594
ırt, 1:10,000 scale	178	135	313
ırt, 1:10,000 scale (barbor of New Orleans)	44	16	60
ap of lower Mississippi River	7	7	14
ɜa Basin	11	11	22
s Basin	11	10	21
ıl	3,352	1,953	5,305

eds deposited with the assistant treasurer of the United States at St. ıIo., $258.38.

TABLE No. 1.—*Highest and lowest gauge readings of 1907.*

MISSISSIPPI RIVER.

Station.	Distance from Cairo.	Elevation of gauge zero above Cairo datum plane.	Elevation of gauge zero above mean Gulf level.	Highest.					Lowest.				
				Prior to 1907.		1907.		Difference compared with previous highest.	Prior to 1907.		1907.		Difference compared with previous lowest.
				Date.	Gauge reading.	Date.	Gauge reading.		Date.	Gauge reading.	Date.	Gauge reading.	
	Miles. Above.	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Aitkin, Minn	1,090	1,206.78	.....	July 6-8, 1905	16.36	Apr. 6, 7	13.10	− 3.26	July 29, 1902	1.3	Nov. 30	2.0	+ 0.7
St. Paul, Minn	874	704.57	.....	Apr. 29, 1881	19.7	Apr. 4	13.3	− 6.4	Mar. 19, 20, 22, 1896	− .9	Dec. 7	1.3	+ 2.2
Hastings, Minn	849	690.79	.....	Apr. 30, 1881	18.00	Apr. 4, 5	13.5	− 4.5	Nov. 23, 1892	− .70	Dec. 10-13	1.4	+ 2.10
Winona, Minn	760	660.34	.....	June 18, 1880	16.87	Apr 4	13.1	− 3.77	Dec. 30, 1889	− 1.33	Dec. 26, 27, 29, 30.	1.7	+ 3.03
Prairie du Chien, Wis	668	625.59	.....	June 22, 1880	21.30	Apr. 8	15.0	− 6.30	1864	− .2	Dec. 3-5	3.0	+ 3.2
Rock Island, Ill	510.7	562.37	.....	June 27, 1892	19.4	Apr. 13	13.6	− 5.8	Jan. 5, 6, 1890	− .9	Dec. 22, 26	1.8	+ 2.7
Burlington, Iowa	427.6	531.25	.....	May 18, 19, 1888 / June 30, 1892	17.6	Apr. 15, 16	11.4	− 6.2	Dec. 4, 5, 1895	− 1.1	Dec. 26	1.1	+ 2.2
Nashville, Iowa	393.6	516.86	.....	May 17, 18, 1888	12.0	Apr. 16-19	7.4	− 4.6	Jan. 7, 1890	− .5	Dec. 24, 25	0.8	+ 1.3
Hannibal, Mo	329.4	469.60	.....	June 8, 1903	22.5	July 23	14.7	− 7.8	Jan. 9, 1890	− 1.75	Dec. 29-31	1.9	+ 3.65
Grafton, Ill	233	424.09	.....	June 11, 1903	28.7	Jan. 23	18.1	−10.6	Dec. 9, 1895	− .9	Dec. 23, 30, 31	5.2	+ 6.1
Alton, Ill	216.2	333.974	.....	June 9, 1903	115.80	July 25	104.10	−11.70	Dec. 19, 1897 / Jan. 28, 29, 1902	82.70	Dec. 29	86.70	+ 4.0
St. Louis, Mo	190.8	400.22	.....	June 10, 1903	[a] 38.00	do	28.00	−10.00	Jan. 2, 1900	− 2.52	Dec. 29, 30	4.30	+ 6.82
Chester, Ill	115.5	361.30	.....	June 13, 14, 1903	33.3	July 26	24.00	− 9.3	Jan. 3, 1900	− 4.1	Dec. 13-16	4.10	+ 8.20
Grand Tower, Ill	85	342.17	.....	Sept. 23, 1905	28.4	Jan. 24	26.2	− 2.2	Jan. 18, 1905	4.1	do	8.5	+ 4.4
Cape Girardeau, Mo	54.5	324.97	.....	June 14, 1903	36.53	Jan. 25	29.0	− 7.53	Feb. 1, 1902	.8	Dec. 12-14	8.3	+ 7.5
Grays Point, Mo. [b]	48	321.28	.....	June 14, 15, 1903	35.40	do	29.3	− 6.10	Dec. 31, 1880	.95	Dec. 13, 14	8.3	+ 7.35
	Below.												
Cairo, Ill	0	290.84	.....	Feb. 27, 1883	52.17	Jan. 27	50.33	− 1.84	Dec. 24, 1871	− 1.00	Nov. 1	9.50	+10.50
Columbus, Ky	21.6	286.76	.....	Feb. 26, 1883	45.58	do	44.68	− .90	Nov. 6-8, 1895	.05	do	10.29	+10.24
Morrisson Landing, Mo. [c]	69	275.80	.....	Feb. 24, 1884	41.50	.....	.....	.....	Nov. 11-14, 1879	− .17	.....	.....	.....
New Madrid, Mo	70.3	[d] 275.72	.....	Mar. 29, 1897	40.27	Jan. 29	39.32	− .95	Nov. 6-8, 1895	.55	Nov. 3	8.08	+ 7.53
Cottonwood Point, Mo	122.5	[e] 250.67	.....	Mar. 19, 1903	39.96	Jan. 31	38.45	− 1.51	Nov. 5-8, 1895	− 3.35	Nov. 3, 4	5.60	+ 8.95
Fulton, Tenn	175.4	228.55	.....	do	40.15	Feb. 2	38.35	− 1.80	Nov. 7, 8, 1895	.16	Nov. 4	6.85	+ 6.69
Memphis, Tenn	230.0	203.97	.....	Mar. 20, 1903	40.10	Feb. 3	40.30	+ .20	Nov. 6-9, 1895	− 2.65	Nov. 5-7	6.50	+ 9.15
Mhoon Landing, Miss	276.3	181.48	.....	Mar. 25, 1903	41.81	Feb. 4, 5	42.20	+ .39	Nov. 6-11, 1895	− 7.80	Nov. 5, 6	3.6	+11.40
Helena, Ark	306.5	161.98	.....	Apr. 4, 1897	51.75	Feb. 6	50.39	− 1.36	Nov. 8, 9, 1895	− 3.00	Nov. 6, 7	9.00	+12.00
Sunflower Landing, Miss.	352.7	147.08	.....	Mar. 27, 28, 1903	48.00	do	47.70	− .30	Nov. 12-14, 1895	− 1.50	Nov. 6-8	9.40	+10.90
Mouth White River, Ark.	393.2	.....	108.98	Mar. 28, 29, 1903	53.70	Feb. 7, 8	51.90	− 1.80	Dec. 28, 1872	0.00	Nov. 8	12.35	+12.35

Vicksburg, Miss.	599.3	.....	46.10	Apr. 16, 1897	52.48	Feb. 12, 13	49.65	− 2.83	Nov. 13, 14, 1895	− 6.5	Nov. 11	6.60	+13.10
St. Joseph, La.	648.3	.....	33.15	Mar. 28, 1903	48.07	....do	46.15	− 1.92	Nov. 13, 1895	− 9.3	Nov. 11, 12	2.60	+11.90
Natchez, Miss.	700.3	.....	17.09	Mar. 28–30, 1903; Apr. 2, 1903	50.35	Feb. 13, 14	48.9	− 1.45	Nov. 13–15, 1895	− .85	....do	8.6	+ 9.45
Red River Landing, La.	765.3	.....	3.57	May 14, 15, 1897	[illegible]	Feb. 15	46.93	− 3.27	Nov. 14, 1895	− .60	Nov. 13	7.76	+ 8.36
Bayou Sara, La.	799.8	.....	4.15	May 13–15, 1897	[illegible]	Feb. 18	40.3	− 3.4	Nov. 16, 1895	− 2.8	Nov. 14	2.9	+ 5.7
Baton Rouge, La.	833.3	.....	− .42	....do	40.65	Feb. 17–19	37.40	− 3.25	Nov. 14, 1894	.45	Nov. 15	4.65	+ 4.20
Plaquemine, La.	854.1	.....	.44	May 13–17, 1897	36.25	....do	33.40	− 2.85	....do	− .94	Nov. 14–16	2.8	+ 3.74
Donaldsonville, La.	885.4	.....	−1.01	May 13, 1897	32.75	Feb. 16–19	30.05	− 2.70	Nov. 11, 1894	1.00	Nov. 15, 16	3.23	+ 2.23
College Point, La.	904.5	.....	.29	May 15, 1897	27.95	Feb. 14, 15, 17–19.	25.90	− 2.05	Nov. 14, 1894	− .91	Nov. 14–16	1.35	+ 2.26
Carrollton, La.	957.0	.....	− .13	Mar. 29, 1903; Apr. 5, 6, 1903	19.42	Feb. 16	18.60	− .82	Dec. 27, 1872	− 1.60	Nov. 16	.65	+ 2.25
Algiers, La.	966.0	.....	−2.64	Mar. 25, 26, 29, 1903	19.9	....do	19.4	− .5	Dec. 20, 28, 1904	2.0	Nov. 13, 14, 16	3.4	+ 1.40
Fort Jackson, La.	1,039.0	.....	−1.68	Mar. 27, 1903	8.05	Feb. 13, 14, 16, 18, 19, 21.	8.3	+ .25	Nov. 12, 14, 1894; Dec. 7, 1893	.3	Nov. 14	1.5	+ 1.20

[a] High water of June 28, 1844 would read 41.4 feet.
[b] Gage transferred to Cape Girardeau in 1896.
[c] Gage transferred to New Madrid in 1893.
[d] 276.19 feet by ordinary levels of 1905.
[e] 250.57 feet by ordinary levels of 1905.

TABLE No. 1.—*Highest and lowest gauge readings of 1907*—Continued.

TRIBUTARIES OF MISSISSIPPI RIVER AND THE ATCHAFALAYA.

River.	Station.	Approximate distance of station from—	Elevat'n of gauge zero above Cairo datum plane.	Elevat'n of gauge zero above mean Gulf level.	Highest.					Lowest.				
					Prior to 1907.		1907.			Prior to 1907.		1907.		
					Date.	Gauge reading.	Date.	Gauge reading.	Difference compared with previous highest.	Date.	Gauge reading.	Date.	Gauge reading.	Difference compared with previous lowest.
		Miles.	*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*		*Feet.*		*Feet.*	*Feet.*
Arkansas	Little Rock, Ark	Mouth 176	241.53	.....	May 21, 1892.	31.20	May 11	23.00	− 8.2	Oct. 23, 24, 1879	1.8	Oct. 29, 30	3.10	+ 1.3
Do.[a]	Pine Bluff, Ark	Mouth 110	200.34	.....	May 22, 1892.	30.50	.....	.....	.....	Nov. 20-23, 1887	−0.40	.....	.....	.....
Atchafalaya	Barbre Landing, La.	Head 0	.....	3.88	May 13,14,'97	50.95	Feb. 19, 20	45.60	− 5.35	Oct. 26, 1897	−1.77	Nov. 13, 14	6.60	+ 8.37
Do.[b]	Simmesport, La	Head 4	.....	5.79	May, 1897	47.32	do	42.3	− 5.02	Nov. 8, 1891	−3.5	do	3.4	+ 6.9
Do	Melville, La	Head 31	.....	0.44	Apr. 4, 5, '03.	38.7	do	37.7	− 1.0	Nov. 12, 13, 1894	1.0	Nov. 14	7.6	+ 6.6
Cumberland	Nashville, Tenn	Cairo 244	.....	314.62	Jan. 22, 1882.	55.30	Mar. 3	38.90	−16.4	Oct. 15, 16, 1878	−0.40	Nov. 1	7.00	+ 7.4
Illinois	Peoria, Ill	Mouth 160	448.95	.....	Mar. 28,29,'04	23.00	Jan. 24, 25	20.4	− 2.6	Oct. 7, 1890	2.6	Nov. 21	9.8	+ 7.2
Do.[a]	Beardstown, Ill	Mouth 86	444.29	.....	1882	21.3	.....	.....	.....	Aug. 11, 12, 1887	0.00	.....	.....	.....
Missouri	Kansas City, Mo	Mouth 388	737.44	.....	June 1, 2, '03.	<35.0	July 20, 21	23.5	−11.5	Dec. 2, 1874[d]	1.5	Jan. 29	3.8	+ 2.3
Do.[a]	Coles Creek, Mo	Mouth 107	433.97	.....	May 15, 1892.	96.76	.....	.....	.....	Dec. 24, 1897	70.7	.....	.....	.....
Do	Hermann, Mo	Mouth 103	502.17	.....	June 6, 1903.	<29.5	July 23, 24	19.5	−10.0	Dec. 21, 22, 1878	−0.75	Dec. 28, 29	4.9	+ 5.65
Ohio	Cincinnati, Ohio	Mouth 504	.....	429.44	Feb. 14, 1884.	71.06	Jan. 21	65.1	− 5.96	Sept. 18, 1881	1.92	Oct. 31	7.0	+ 5.08
Do	Louisv'le (up.), Ky.	Mouth 364	.....	403.00	Feb. 16, 1884.	46.60	Jan. 22	41.4	− 5.2	Sept. 10-14, 18-22, '81; Nov. 14-16, '95	1.70	Nov. 1	3.4	+ 1.7
Do	Louisv'le (low.), Ky.	Mouth 364	.....	376.06	do	72.00	do	67.0	− 5.0	Oct. 17, 18, 1872	1.60	do	6.3	+ 4.7
Do	Evansville, Ind	Mouth 183	.....	329.18	Feb. 19, 1884.	48.8	Jan. 24, 25	46.2	− 2.6	Nov. 7, 8, 1895	−0.3	do	5.3	+ 5.6
Do	Paducah, Ky	Mouth 45	.....	286.26	Feb. 23, 1884.	54.25	Jan. 28	45.7	− 8.55	Oct. 30-Nov. 4, 1895	−0.7	do	3.6	+ 4.3
Do	Cairo, Ill	Mouth 1	290.84	.....	Feb. 27, 1883.	52.17	Jan. 27	50.33	− 1.84	Dec. 24, 1871	−1.00	do	9.50	+10.50
Ouachita	Camden, Ark	Mo. Red Riv. 325	.....	71.10	May 12, 1882.	46.0	Jan. 6	42.90	− 3.1	Aug. 29, 30, 1887	1.80	Oct. 4-7	3.50	+ 1.7
Do	Monroe, La	Mo. Red Riv. 175	.....	30.97	1874	49.1	Jan. 23-26	38.5	−10.6	Sept.-Nov. '97, '99, '01	0.0	Sept. 12	1.8	+ 1.8
Red	Fulton, Ark	Mouth 508	.....	224.48	July 17, 1876.	35.75	June 4	31.30	− 4.45	Oct. 20-22, 1896	0.10	Sept. 28	6.50	+ 6.4
Do.[a]	Garland, Ark	Mouth 450	.....	203.16	Mar. 24, 1894.	28.50	.....	.....	.....	Sept. 22-25, 1896	−0.20	.....	.....	.....
Do	Shreveport, La	Mouth 320	.....	140.99	May 28, 1892.	35.70	June 13	26.9	− 8.8	Dec. 2-4, 1894	−5.50	Oct. 3	−1.8	+ 3.7
Do	Alexandria, La	Mouth 110	.....	44.18	June 12, 13, '92	38.25	June 17, 18	32.50	− 5.75	Sept. 29, 1881	−3.7	Oct. 2, 3	1.60	+ 5.3
St. Francis	Bridge, St. L., I. M. and S. Ry.	Mouth 194	.....	.....	Apr. 4-6, 1897	41.6	Jan. 15-19	31.4	−10.2	Nov. 3-11, 1901	−0.05	Oct. 29, 30	1.8	+ 1.85
Do.[a]	Wittsburg, Ark	Mouth 180	.....	.....	Apr. 28, 1886.	42.02	.....	.....	.....	Oct. 27-31, Nov. 10-14, 1892.	−3.60	.....	.....	.....
Tennessee	Chattanooga, Tenn.	Cairo 495	.....	632.00	Mar. 11, 1867.	58.6	Jan. 1	20.5	−38.1	Sept. 11-14, 1881, and Sept. 19, 1883.	0.00	Oct. 21-29, Nov. 2.	2.00	+ 2.00
Do	Florence, Ala	Cairo 300	.....	400.85	Mar. 19, 1897.	32.20	Mar. 5, 6	14.50	−17.7	Oct., '72. Sept. 18, '78.	−0.76	Oct. 28-Nov. 1.	0.30	+ 1.06
Do	Johnsonville, Tenn	Cairo 139	.....	323.1	1882	48.0	Mar. 5	25.4	−22.6	Oct. 26-Nov. 4, 1904.	−0.9	Nov. 1	1.4	+ 2.3

TABLE No. 2.—*Maximum heights above Memphis datum at high water and regular gauges on the Mississippi River from Cairo to the Passes during high water of 1908, with high water of 1903 for comparison—March-April rise of 1908 in separate column.*

Designation of gauges.	Distance from Cairo.	Highest water, 1908. Date.	Highest water, 1908. Elevation above Memphis datum.	Highest water of 1903, elevation above Memphis datum.	Difference between highest of 1908 and 1903.	Method of obtaining highest reading 1908.[a]	Highest of March-April rise, 1908. Date.	Highest of March-April rise, 1908. Elevation above Memphis datum.	Difference between highest March-April rise, 1908 and 1903.
	Miles.		*Feet.*	*Feet.*	*Feet.*			*Feet.*	*Feet.*
Cairo	0	Mar. 18-19	323.3	328.3	−5.0	.....	(b)	.....	.....
182	4.0	Mar. 18	322.3	326.2	−3.9	.....	(b)	.....	.....
181	9.0	.....	.....	.....	.....	.....	(b)	.....	.....
180	12.0	Mar. 18-19	320.3	323.7	−3.4	.....	(b)	.....	.....
179	17.8	Mar. 19	316.6	320.8	−4.2	.....	(b)	.....	.....
Columbus	21.6	Mar. 18-19	315.5	318.1	−2.6	.....	(b)	.....	.....
178	27.5	Mar. 18	313.8	316.2	−2.4	.....	(b)	.....	.....
177	33.5	Mar. 19-20	311.6	314.0	−2.4	.....	(b)	.....	.....
176	38.5	Mar.	309.0	311.6	−2.6	Stain	(b)	.....	.....
175	44.5	Mar. 19	307.4	309.4	−2.0	.....	(b)	.....	.....
174	49.8	Mar. 19-20	305.5	307.4	−1.9	.....	(b)	.....	.....
173	54.5	Mar.	304.7	306.0	−1.3	.....	(b)	.....	.....
172	59.5	Mar. 20	303.9	306.0	−2.1	.....	(b)	.....	.....
171	64.5	Mar.	302.0	.....	.....	.....	(b)	.....	.....
New Madrid	70.3	Mar. 20-21	299.2	302.1	−2.9	.....	(b)	.....	.....
170	73.5	Mar.	297.8	.....	.....	.....	(b)	.....	.....
169	77.3	Mar. 20	295.1	297.5	−2.4	.....	(b)	.....	.....
168	84.8	do	291.7	295.6	−3.9	.....	(b)	.....	.....
167	89.5	Mar. 20-21	288.2	292.3	−4.1	.....	(b)	.....	.....
166	95.0	Mar. 21	285.5	289.4	−3.9	.....	(b)	.....	.....
165	99.3	Mar. 20	283.7	287.8	−4.1	.....	(b)	.....	.....
164	103.8	Mar.	281.1	286.2	−5.1	Stain	(b)	.....	.....
163	109.3	Mar. 20-21	278.7	283.4	−4.7	.....	(b)	.....	.....
162	113.8	Mar. 21	277.0	281.4	−4.4	.....	(b)	.....	.....
161	118.5	do	274.4	279.1	−4.7	.....	(b)	.....	.....
Cottonwood Point	122.5	do	273.1	277.6	−4.5	.....	(b)	.....	.....
160	127.4	Mar. 21-22	271.3	276.3	−5.0	.....	(b)	.....	.....
159	131.5	Mar. 22	269.5	.....	.....	.....	(b)	.....	.....
158	135.0	do	268.3	273.7	−5.4	.....	(b)	.....	.....
157	140.0	do	266.0	271.8	−5.8	.....	(b)	.....	.....
156	146.0	do	262.6	.....	.....	.....	(b)	.....	.....
155	152.5	Mar. 23	258.9	265.1	−6.2	.....	(b)	.....	.....
154	158.0	Mar. 22-23	256.4	262.6	−6.2	.....	(b)	.....	.....
153	161.8	Mar. 22	255.1	261.6	−6.5	.....	(b)	.....	.....
152	167.5	do	252.4	.....	.....	.....	(b)	.....	.....
151	172.8	Mar. 23	249.8	.....	.....	.....	(b)	.....	.....
Fulton	175.4	Mar. 22-23	248.7	255.6	−6.9	.....	(b)	.....	.....
150	180.1	Mar.	246.4	253.9	−7.5	.....	(b)	.....	.....
149	186.3	Mar. 23-24	243.9	250.4	−6.5	.....	(b)	.....	.....
148	192.3	Mar. 24	241.8	247.8	−6.0	.....	(b)	.....	.....
147	196.8	do	241.5	246.8	−5.3	.....	(b)	.....	.....
146	203.8	Mar.	237.8	243.8	−6.0	.....	(b)	.....	.....
145	208.0	Mar. 23-24	236.0	.....	.....	.....	(b)	.....	.....
144	212.5	Mar.	233.2	.....	.....	Stain	(b)	.....	.....
143	219.8	do	232.0	236.7	−4.7	.....	(b)	.....	.....
142	225.5	Mar. 23-24	228.5	232.7	−4.2	.....	(b)	.....	.....
Memphis	230.0	Mar. 23-25	226.5	231.0	−4.5	.....	(b)	.....	.....
141	235.0	do	223.8	228.4	−4.6	.....	(b)	.....	.....
140	239.5	Mar. 23-24	221.7	225.6	−3.9	.....	(b)	.....	.....
139	243.5	Mar. 23	219.7	224.4	−4.7	.....	(b)	.....	.....
138	249.7	Mar. 24	217.0	221.6	−4.6	.....	(b)	.....	.....
137	254.5	Mar. 25	213.4	217.5	−4.1	.....	(b)	.....	.....
136	261.3	Mar. 24-25	210.8	215.0	−4.2	.....	(b)	.....	.....
135	266.8	Mar.	209.0	213.2	−4.2	.....	(b)	.....	.....
134	271.0	Mar. 26	207.4	211.0	−3.6	.....	(b)	.....	.....
Tiptonon Landing	276.3	Mar. 24-26	206.4	210.2	−3.8	.....	(b)	.....	.....
133	280.5	Mar. 26	205.4	209.2	−3.8	.....	(b)	.....	.....
132	283.7	.....	.....	206.6	.....	.....	(b)	.....	.....
131	289.5	Mar. 25	200.3	205.6	−5.3	.....	(b)	.....	.....

[a] When not otherwise stated the high-water readings were taken on the gauges.

[b] All March-April readings below high-water gauge No. 116 were taken on the gauges. From Cairo to high-water gauge No. 116 the March-April rise was the maximum of the year; below that the May-June rise was the maximum, therefore beginning with high-water gauge No. 115 both rises are given in this table.

TABLE No. 2.—*Maximum heights above Memphis datum at high water and regular gauges on the Mississippi River from Cairo to the Passes during high water of 1908, with high water of 1903 for comparison—March-April rise of 1908 in separate column*—Continued.

Designation of gauges.	Distance from Cairo.	Highest water, 1908.		Highest water of 1903, elevation above Memphis datum.	Difference between highest of 1908 and 1903.	Method of obtaining highest reading 1908.[a]	Highest of March-April rise, 1908.		Difference between highest March-April rise, 1908 and 1903.
		Date.	Elevation above Memphis datum.				Date.	Elevation above Memphis datum.	
Mhoon Landing—Continued.	*Miles.*		*Feet.*	*Feet.*	*Feet.*			*Feet.*	*Feet.*
130	292.8			204.0			(b)		
129	297.8	Mar. 24-26	197.3	203.7	−6.4		(b)		
128	301.5	Mar. 26	196.5	202.0	−5.5		(b)		
Helena	306.5	do	194.0	199.8	−5.8		(b)		
127	312.5			197.2			(b)		
126	317.8	Mar. 23-24	190.1	195.3	−5.2		(b)		
125	324.5	Mar. 25-26	188.4	193.2	−4.8		(b)		
124	329.5	Mar. 26-27	186.3	191.2	−4.9		(b)		
123	334.3	do	185.2	189.5	−4.3		(b)		
122	338.8	Mar. 27-28	182.8	186.6	−3.8		(b)		
121	343.3	Mar.	181.2	185.5	−4.3	Stain	(b)		
120	346.8	Mar. 27	179.3	184.0	−4.7		(b)		
Sunflower Landing	352.7	Mar. 26-27	177.1	182.0	−4.9		(b)		
119	357.0			180.6			(b)		
118	362.0	Mar. 25-27	174.0	179.4	−5.4		(b)		
117	366.8	Mar.	172.2	177.8	−5.6		(b)		
116	372.0	do	170.5	176.5	−6.0		(b)		
115	378.0	May 30	168.4	173.8	−5.4		Mar. 26-27	167.6	−6.2
114	383.5	June 1	166.8	171.7	−4.9		do	165.9	−5.8
113	390.3	June	166.5	171.0	−4.5		Mar. 26	164.8	−6.2
Mouth of White River.	393.2	May 30-June 2.	165.1	169.3	−4.2		Mar. 26-27	163.7	−5.6
112	398.5	June	163.5	167.6	−4.1		Mar.	162.2	−5.4
111	401.5	do	162.6	166.6	−4.0		do	161.2	−5.4
110	408.0	do	161.4	164.8	−3.4	Stain			
109	411.5	do	160.1	163.9	−3.8	do	Mar.	159.6	−4.3
108	416.8			163.3			Mar. 29-31	158.1	−5.2
107	421.5	June	157.0	162.3	−5.3	Stain			
106	427.0	do	156.7	160.6	−3.9		Mar. 29-30	154.7	−5.9
105	432.3	do	154.6	157.8	−3.2	Stain	Mar. 29-31	153.0	−4.8
Arkansas City	438.3	June 1-4	153.2	156.3	−3.1		Mar. 28-Apr. 1.	151.5	−4.8
104	444.3	June	150.8	153.5	−2.7	Stain	Mar. 29	149.2	−4.3
103	449.5			152.7					
102	453.0			149.7			Mar.	144.4	−5.3
101	459.5	June	145.5	149.4	−3.9	Stain	Mar. 29-31	143.7	−5.7
100	463.5	do	145.4	148.6	−3.2	do		143.6	−5.0
99	467.5			147.8					
98	473.0	June	141.9	145.7	−3.8		Mar. 27-28	139.5	−6.2
Greenville	478.3	June 2 5	139.6	144.0	−4.4		Mar. 28-Apr. 1.	137.4	−6.6
97	482.5	June	138.8	143.3	−4.5	Stain			
96	487.0	do	137.9	142.1	−4.2	do			
95	489.8	do	137.6	141.4	−3.8		Mar. 30-Apr. 1.	135.4	−6.0
94	495.3	do	135.3	139.5	−4.2	Stain	Mar. 30	133.2	−6.3
93	501.5	do	133.9	137.3	−3.4	do	Mar. 30-31	132.2	−5.1
92	505.5			135.8			Mar. 31-Apr. 1.	130.0	−5.8
91	510.3	June 4	129.2	133.0	−3.8		Mar. 30-Apr. 1.	127.3	−5.7
90	516.5	June	127.7	131.0	−3.3	Stain	Apr. 1	126.4	−4.6
89	522.5	do	126.2	129.9	−3.7			124.3	−5.6
88	525.8	do	124.7	128.0	−3.3	Stain		123.1	−4.9
87	531.5	do	123.3	126.2	−2.9	do			
86	537.5	do	121.4	124.2	−2.8	do	Mar. 31-Apr. 1.	119.9	−4.3

[a] When not otherwise stated the high-water readings were taken on the gauges.

[b] All March-April readings below high-water gauge No. 116 were taken on the gauges. From Cairo to high-water gauge No. 116 the March-April rise was the maximum of the year; below that the May-June rise was the maximum, therefore beginning with high-water gauge No. 115 both rises are given in this table.

No. 2.—*Maximum heights above Memphis datum at high water and regular on the Mississippi River from Cairo to the Passes during high water of 1908, igh water of 1903 for comparison—March-April rise of 1908 in separate column*—nued.

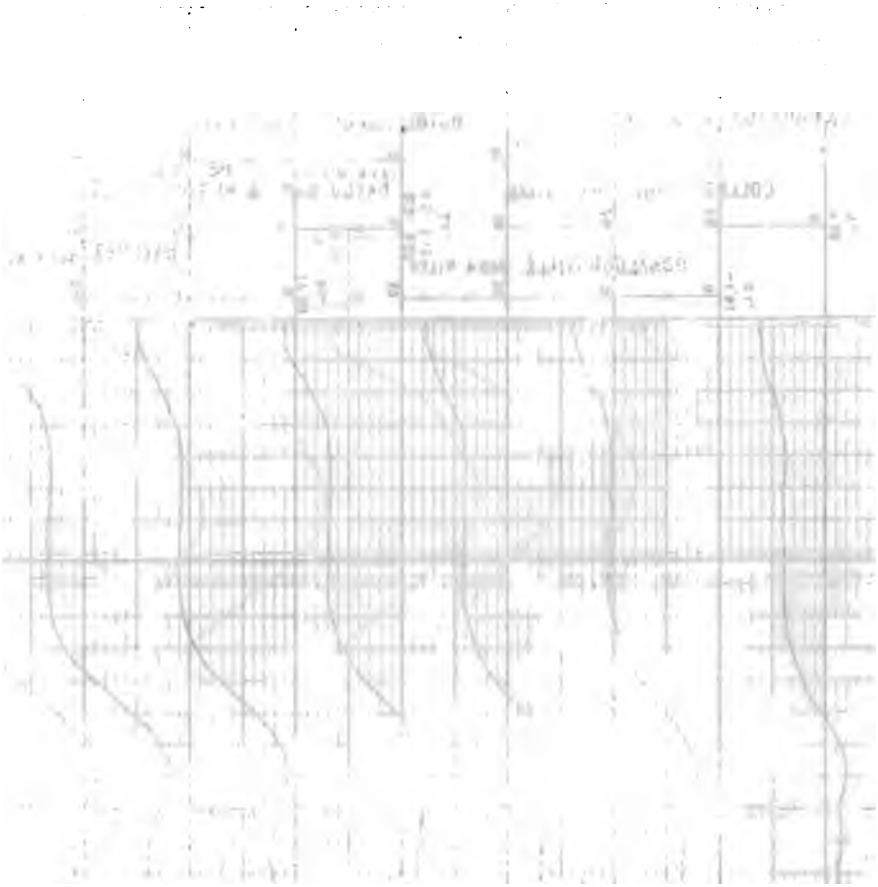
tion of es.	Distance from Cairo.	Highest water, 1908.		Highest water of 1903, elevation above Memphis datum.	Difference between highest of 1908 and 1903.	Method of obtaining highest reading 1908.[a]	Highest of March-April rise, 1908.		Difference between highest March-April rise, 1908 and 1903.
		Date.	Elevation above Memphis datum.				Date.	Elevation above Memphis datum.	
	Miles.		*Feet.*	*Feet.*	*Feet.*			*Feet.*	*Feet.*
ridence.	542.3	June 5	120.7	123.0	−2.3	.....	Mar. 30–Apr. 2.	119.1	−3.9
.....	546.8	June	119.6	122.4	−2.8	Stain	Mar. 30–Apr. 3.	118.2	−4.2
.....	552.0	do	117.2	120.7	−3.5	.....	Mar	116.6	−4.1
.....	556.5	do	115.9	118.6	−2.7	Stain	.....	.....	.....
.....	561.3	do	114.4	117.1	−2.7	do	.....	.....	.....
.....	568.0	do	111.0	113.6	−2.3	do	Mar. 31–Apr. 2.	109.4?	−4.2
.....	573.5	do	108.5	112.0	−3.5	do	Mar	108.0	−4.0
.....	578.0	do	107.4	110.6	−3.2	do	Mar. 31–Apr. 2.	106.2	−4.4
.....	583.0	do	105.7	109.5	−3.8	do	Mar. 30–31	104.7	−4.8
.....	588.5	.....	.....	107.6	.....	.....	.....	.....	.....
.....	593.5	June	102.6	106.3	−3.7	Stain	Mar	101.6	−4.7
.....	599.3	June 5–8	100.8	104.7	−3.9	.....	Apr. 2	99.8	−4.9
.....	602.5	June	99.5	103.2	−3.7	Stain	Apr. 1–3	98.6	−4.6
.....	606.8	.....	.....	101.9	.....	.....	Apr. 2–5	97.5	−4.4
.....	612.3	June	96.0	99.3	−3.3	Stain	Mar. 31	95.1	−4.2
.....	617.5	do	93.5	97.2	−3.7	.....	Apr. 2–3	92.8	−4.4
.....	622.0	do	92.6	.....	.....	.....	Apr. 1	91.5	.....
.....	627.5	do	91.0	94.5	−3.5	Stain	Mar. 31	89.1	−5.4
.....	633.0	do	88.8	93.3	−4.5	do	Apr. 3	87.8	−5.5
.....	637.3	do	87.2	90.2	−3.0	.....	Apr	85.4	−4.8
.....	642.8	do	86.0	88.9	−2.9	Stain	do	85.5?	−3.4
.....	648.3	June 7–8, 10–12.	84.4	87.7	−3.3	.....	Apr. 2–3	83.2	−4.5
.....	655.3	June	81.9	85.0	−3.1	Stain	Apr. 1–3	81.0	−4.0
.....	659.8	do	80.9	83.8	−2.9	.....	Apr. 4	80.0	−3.8
.....	663.8	do	80.1	82.9	−2.8	.....	Apr	78.5	−4.4
.....	681.0	do	79.3	81.8	−2.5	Stain	Apr. 1–6	77.5	−4.3
.....	685.5	do	78.5	80.7	−2.2	.....	Apr. 3–7	76.8	−3.9
.....	691.5	do	76.3	78.5	−2.2	Stain	Apr. 2	75.5?	−3.0
.....	696.0	do	75.1	76.8	−1.7	do	Apr. 3–5	73.1	−3.7
.....	700.3	June 16	72.7	74.1	−1.4	.....	Apr. 3–9	70.7	−3.4
.....	705.3	June	71.7	72.9	−1.2	Stain	Apr. 1–9	69.8	−3.1
.....	712.0	do	70.9	72.2	−1.3	do	Apr. 5–9	68.7	−3.5
.....	716.0	do	70.0	71.6	−1.6	do	Apr. 3–9	67.8	−3.8
.....	720.5	do	68.4	69.8	−1.4	do	Apr	66.1	−3.7
.....	725.3	do	67.7	68.7	−1.0	do	do	65.2	−3.5
.....	731.0	.....	.....	66.5	.....	.....	Apr. 6–7	63.5	−3.0
.....	737.5	June	65.0	65.5	−.5	.....	Apr. 4	62.4	−3.1
.....	742.3	June 15	64.0	64.4	−.4	.....	Apr. 8–9	60.9	−3.5
.....	747.0	June	62.7	63.6	−.9	Stain	Apr	59.0	−4.6
.....	751.0	do	62.4	62.8	−.4	do	.....	.....	.....
.....	756.0	do	60.8	62.0	−1.2	.....	.....	.....	.....
.....	761.0	June 15	60.1	61.4	−1.3	.....	Apr 9–12	56.6	−4.8
Land-	765.3	June 14–16	59.5	60.7	−1.2	.....	Apr. 15–16	56.0	−4.7
.....	769.0	June 14	58.7	60.0	−1.3	.....	Apr	55.0	−5.0
.....	771.3	June 15	58.4	59.6	−1.2	.....	Apr. 15	54.8	−4.8
.....	778.5	June	56.7	57.9	−1.2	.....	.....	.....	.....
.....	784.8	June 17	56.6	57.3	−.7	.....	Apr. 16–17	52.0	−5.3
.....	790.5	June	56.0	56.0	0	.....	Apr	51.0	−5.0
.....	795.5	June 17	55.0	55.1	−.1	.....	Apr. 15–16	50.8	−4.3
ra	799.8	June 15–17	53.4	54.2	−.8	.....	do	49.2	−5.0
.....	803.5	June 18	52.5	52.8	−.3	.....	Apr. 15	48.0	−4.8
.....	808.0	June 15	51.9	52.8	−.9	.....	Apr 15–16	47.5	−5.3
.....	813.0	June	51.5	51.4	+.1	.....	do	47.1	−4.3
.....	817.0	.....	.....	50.4	.....	.....	Apr. 15	45.4	−5.0
.....	822.5	June	49.1	50.0	−.9	.....	.....	.....	.....
.....	828.5	do	47.2	47.8	−.6	.....	Apr. 15	42.9	−4.9

[a] When not otherwise stated the high-water readings were taken on the gauges.

TABLE No. 2.—*Maximum heights above Memphis datum at high water gauges on the Mississippi River from Cairo to the Passes during high wa with high water of 1903 for comparison—March-April rise of 1908 in separ* Continued.

Designation of gauges.	Distance from Cairo.	Highest water, 1908.		Highest water of 1903, elevation above Memphis datum.	Difference between highest of 1908 and 1903.	Method of obtaining highest reading 1908.[a]	Highest of 1 April rise,
		Date.	Elevation above Memphis datum.				Date.
	Miles.		*Feet.*	*Feet.*	*Feet.*		
Baton Rouge	833.3	June 16-17	46.5	47.0	−0.5		Apr. 15
35	839.3	June	45.7	46.4	− .7		Apr. 15-16
34	844.0	do	44.8	45.5	− .7		Apr
33	850.0	do	43.6	44.4	− .8		
Plaquemine	854.1	June 15-16	43.1	44.1	−1.0		Apr. 15
32	859.5	June	42.0	42.8	− .8		do
31	864.5	do	41.1	42.0	− .9		Apr. 14
30	870.0	do	40.5	41.0	− .5		Apr. 14-16
29	874.2	do	40.0	40.6	− .6	Stain	
28	880.0	do	39.1	39.7	− .6		Apr. 15
Donaldsonville	885.4	June 18	38.0	38.8	− .8		Apr. 14-16
27	889.8	June	37.9	38.5	− .6		Apr. 15-17
26	895.8	do	36.4	37.4	−1.0		Apr. 12
25	900.3	do	35.7	36.2	− .5		Apr. 15
College Point	904.5	June 17	35.3	35.9	− .6		Apr. 12,15-17
24	910.5	June	34.0	34.5	− 5		Apr. 16-17
23	914.8	do	33.4	33.8	−0.4		Apr. 15
22	919.8	June 20	32.5	33.1	− .6		do
21	925.5	do	30.6	32.2	−1.6		do
20	930.5	June 16	30.4	31.1	− .7		do
19	934.3	do	30.2	30.7	− .5		Apr. 15-16
18	937.3	June	29.5	29.9	− .4		Apr. 15
17	943.5	do	28.5	29.2	− .7		Apr. 16
16	947.3	do	28.0	28.9	− .9	Stain	Apr. 15
15	953.0	June 23-24	27.0	27.5	− .5		Apr. 15-16
Carrollton	957.0	June 18	26.7	27.2	− .5		Apr. 14-16
Algiers	966.0	do	25.1				Apr. 15-16
14	968.0	June	23.9	24.6	− .7		do
13	973.5	do	23.3	24.1	− .8		Apr. 15
12	979.3	do	22.5	22.8	− .3	Stain	Apr. 16-17
11	983.5	do	21.2	21.9	− .7	do	Apr. 14
10	989.3	do	20.2	21.0	− .8	do	Apr. 15
9	993.0	do	19.5	20.2	− .7	do	Apr.
8	999.0	do	18.7	19.5	− .8	do	Apr. 15
7	1,003.8	do	19.0	19.0	0		Apr. 16
6	1,008.3	June 17	18.0	18.0	0		Apr. 15
5	1,013.0	June	18.3	17.8	+ .5		do
4	1,019.0	do	16.5	16.9	− .4		do
3	1,023.8			16.7			
2	1,029.0	June	15.6	15.8	− .2		Apr. 20
1	1,034.0	do	14.4	14.7	− .3	Stain	do
Fort Jackson	1,039.0	June 18	14.2	14.1	+ .1		do
A	1,045.3	do	13.6				Apr. 18
B	1,049.5	June 17	13.4				
C	1,055.8	June 18	12.4				Apr. 18

[a] When not otherwise stated the high-water readings were taken on the gau



EDW. WOLBRECHT, Jun. Engr.

	Labor.	Office supplies.	Subsistence.	Fuel.	Lighting supplies.	Lubricants.	Materials.	New plant.	Total.	Grand total.
Care of plant	$35,708.87	$180.13	$8,226.63	$9,553.48	$77.08	$83.46	$607.93			$54,437.58
Repairs to floating plant:										
Dredge Beta	3,780.40		901.34		23.80	24.09	370.19		$5,099.82	
Dredge Gamma	744.06		179.75		.79	.98	147.52		1,073.10	
Dredge Delta	1,368.12		273.41		1.19	2.63	300.84		1,946.19	
Dredge Epsilon	510.36		106.04		1.43	2.34	112.96		733.13	
Dredge Zeta	2,115.48		420.59	634.74	3.75	22.26	132.60		3,329.42	
Dredge Iota	3,748.58		835.24	491.11	5.57	80.38	451.75		5,648.63	
Dredge Kappa	2,194.49		475.85		.92	43.76	625.78		3,340.80	
Dredge Henry Flad	1,526.50		336.37		1.87	43.50	201.30		2,109.54	
Dredge Henry Flad (reconstruction)	3,111.55		689.82		.85	157.23	304.40		4,263.85	
Dredge B. M. Harrod	3,255.02		627.60	139.98	1.70	17.90	189.51		4,231.71	
Steamer Sachem	1,728.49		390.37		2.10	11.70	605.68		2,738.34	
Steamer Choctaw	1,345.51		284.04	476.93	2.24	4.44	224.45		2,337.61	
Steamer Nokomis	871.64		176.68		.90	33.34	233.20		1,315.76	
Steamer Wynoka	306.89		60.53		1.89	52.77	275.38		697.46	
Steamer Leota	2,295.89		458.00	634.67	3.48	133.23	212.77		3,738.04	
Steamer Minnetonka	28.99		5.57			1.89			36.45	
Steamer Search	821.17		169.72		3.65	11.76	95.58		1,101.88	
Steamer Vulcan	1,726.39		334.53		.97	16.81	389.17		2,467.87	
Steamer Venus	953.13		191.11	12.00	3.38	27.07	171.23		1,357.92	
Steamer Mars	1,080.92		237.09	5.00	.57	9.65	161.53		1,494.76	
Steamer Mercury	248.48		52.29		.59	1.86	80.87		384.09	
Pile sinker No. 971	4.32		1.26						5.58	
Pile sinker No. 981	98.08		23.02				17.96		139.06	
Pile sinker No. 982	73.68		16.70		.05		.40		90.83	
Pile sinker No. 983	91.56		19.29		.13		7.45		118.43	
Pile sinker No. 984	116.78		23.78			.81	22.49		163.86	
Skiffs	49.39		7.03				5.54		61.96	
Pump boat	66.02		16.11		.06	1.46	5.58		89.23	
Sectional docks	355.93		65.03		.09	.10	48.30		469.45	
Total	34,653.82		7,378.16	2,394.43	61.97	701.96	5,394.43		50,584.77	50,584.77
Operations during low-water season, 1907:										
Dredge Beta	8,878.42	9.66	1,828.84	9,169.22	41.40	417.88	1,149.33		21,494.75	
Dredge Epsilon	4,244.39	4.08	1,020.75	1,688.68	14.41	69.89	381.75		7,413.95	
Dredge Zeta	1,990.86	4.26	439.91	1,008.79	17.97	46.68	87.66		3,596.13	
Dredge Iota	6,089.13	9.13	1,511.00	3,069.33	36.10	42.77	230.67		10,988.13	
Dredge Kappa	7,706.32	6.91	1,654.92	3,186.01	36.59	121.62	487.02		13,199.39	
Dredge Henry Flad	6,723.92	9.02	1,481.32	3,322.02	34.84	137.36	452.17		12,160.65	
Dredge B. M. Harrod	5,507.15	5.87	1,261.34	4,736.67	36.75	172.80	672.41		12,392.99	

TABLE No. 3.—*Cost of dredging operations May 1, 1907, to April 30, 1908*—Continued.

	Labor.	Office supplies.	Subsistence.	Fuel	Lighting supplies.	Lubricants.	Materials.	New plant.	Total.	Grand total.
Operations during low-water season, 1907—Continued.										
Steamer Search	$6,437.50	$28.80	$1,192.96	$1,941.50	$19.35	$78.00	$58.12	.....	$9,756.23	.....
Steamer Vulcan	2,057.92	36.17	404.75	348.67	12.61	23.17	55.88	.....	2,939.17	.....
Steamer Venus	1,980.49	20.75	520.02	422.86	21.00	27.60	30.17	.....	3,022.89	.....
Steamer Mercury	2,139.23	21.91	407.94	522.72	15.53	35.39	38.39	.....	3,181.11	.....
Total	53,755.33	156.56	11,713.75	29,416.47	286.55	1,173.16	3,643.57	.....	100,145.39	$100,145.39
Construction:										
Boiler shop	605.41	.....	127.92	.....	.....	.....	639.68	.....	1,373.01	.....
Dredge B. M. Harrod	76.49	.....	19.89	.....	.....	.....	35.00	.....	131.38	.....
Marine ways [a]	915.23	.....	176.48	17.25	.....	5.69	85.71	.....	1,200.36	.....
Plate-bending rolls	314.27	.....	.....	.....	.....	.....	132.54	.....	446.81	.....
Storehouse	456.66	.....	97.03	.....	.....	.....	625.58	.....	1,179.27	.....
Total	2,368.06	.....	421.32	17.25	.....	5.69	1,518.51	.....	4,330.83	4,330.83
Permanent outfit:										
Purchased	.....	.....	.....	.....	.....	.....	.....	$8,990.76	8,990.76	.....
Repaired	6.00	.....	1.16	.....	.....	.....	2.38	.....	9.54	.....
Total	6.00	.....	1.16	.....	.....	.....	2.38	8,990.76	9,000.30	9,000.30
Buildings and grounds	5,998.01	.....	1,255.88	.....	3.63	75.30	1,873.80	.....	9,206.62	9,206.62
Miscellaneous:										
Buoys, constructing	24.98	.....	6.30	.....	.....	.....	.22	.....	31.50	.....
Hire of vessels, service in fighting fire on dredge Henry Flad	39.34	.....	.....	.....	.....	.....	.....	.....	39.34	.....
Repairs to coal barge	37.16	.....	5.40	.....	.....	.....	12.22	.....	54.78	.....
Testing hose	17.74	.....	4.07	.....	.....	.....	.40	.....	22.21	.....
Testing oils	80.86	.....	10.20	.....	.53	.....	.09	.....	91.68	.....
Total	200.08	.....	25.97	.....	.53	.....	12.93	.....	239.51	239.51
Repairs to tools and appliances	1,176.90	.....	215.42	.....	.....	2.33	188.27	.....	1,582.92	1,582.92
Gardening	173.19	.....	61.63	.....	.....	.....	.12	.....	234.94	234.94
Total cost of dredging operations	134,040.26	336.69	29,299.92	41,381.63	429.76	2,041.90	13,241.94	8,990.76	229,762.86	229,762.86

[a] Preparation of site and borings.

No. 4.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1907.*

The letters R, F, or S, following the gauge readings, indicate rising, falling, or stationary, ly.

ame of crossing.	Miles below Cairo.	Dates of trips.					
		Aug. 19 to Aug. 22.	Sept. 6 to Sept. 7.	Sept. 11 to Sept. 14.	Sept. 17 to Sept. 18.	Sept. 20 to Sept. 21.	Sept. 24 to Sept. 25.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
ge	0	20.0 R	18.0 R	16.0 R	14.8 S	15.0 R	13.5 F
	70	14.5					
rid gauge	70	16.5 to 16.5	15.3 to 14.8	13.8 to 12.7	12.2 R	12.5 S	11.2 F
	74	22.5					
	75						
	76	24.0					
asant	80	20.0					
	82	14.0	12.0	12.5		13.0	
le	85		(a)				
	89		20.0				
	91	18.0					
s	92	19.0	14.0	12.0		13.0	
	93		(a)				
	98	19.0	16.0	15.0		14.0	
	101	16.5	14.0	15.0		14.0	
y	103	20.0	18.0	17.0		17.0	
it	113		(a)				
sland 16	114		(a)				
sland 18	118		24.0				
ood Point gauge	123	14.8 to 14.9	13.6 to 13.0	10.7 F	10.0 to 9.8	10.2 F	9.6 to 9.0
. 20	125		(a)				
sland No. 20	128		24.0	21.5			
sland No. 21	131		23.0	18.0			
Point	133	23.0	20.0	23.0		19.0	
int	136		(a)				
x	139		24.0				
eer	146		17.0	16.0			
ls	150	15.5	18.0	16.0			
	153		24.0				
t	158	17.5	18.0	16.5			
en	162	17.5	15.5	15.0		12.0	
ullerton	167	17.5	15.0	13.5		15.0	
uge	175	14.0 to 14.0	13.2 to 12.7	11.0 F	10.4 to 10.3	10.5 S	10.2 to 9.7
outh of Hatchie	178						
Point	181	22.0	18.0	16.5		19.0	
sland No. 35	193	16.5	13.0	11.0	10.5	11.5	
int	195	19.0	15.0	15.0	14.0	13.5	
	201	23.5	13.5	15.5	15.0	15.0	
	204	13.0	11.5	10.0	10.5	9.5	
Old River	208						
	223	24.0					
ris	225	19.5	18.0				
an	228						
gauge	230	14.5 to 14.5	13.5 F	12.0 F	10.5 F	10.5 S	10.2 F
residents Island	233						16.0
ver (below dredge fleet)	234						
ah	235						
residents Island	239						13.0
e or Fleeces	244						14.0
	247						24.0
	252						17.0
d	254						12.5
odes	255						18.0
	259						18.0
	264						17.0
s	266						17.0

a No bottom.

TABLE No. 4.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1907*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.					
		Aug. 19 to Aug. 22.	Sept. 6 to Sept. 7.	Sept. 11 to Sept. 14.	Sept. 17 to Sept. 18.	Sept. 20 to Sept. 21.	Sept. 24 to Sept. 25.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet*	*Feet.*
Head of McCulloughs Tow Head	269						
Foot of McCulloughs Tow Head	271						12.0
Foxburns	274						
Ashley Point	274						18.0
Mhoons	276						14.5
Hardins	287						17.0
O. K	289						20.0
Island No. 60	297						(a)
Helena gauge	306						13.8 to 13.4
Montezuma	312						14.0
Westover	318						15.0
Island No. 63	331						
Island No. 66	352						24.0
Andersons (foot)	362						13.0
Scrub Grass	385						
Mouth of White River gauge	393						17.6 to 17.2
Indian Point	408						
Cypress Bend	425						
Arkansas City gauge	438						
Moss Lake	455						
Salona	475						

Name of crossing.	Miles below Cairo.	Dates of trips.					
		Sept. 27 to Sept. 29.	Oct. 1 to Oct. 3.	Oct. 8 to Oct. 10.	Oct. 11 to Oct. 13.	Oct. 15 to Oct. 16.	Oct. 18.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	14.0 R	15.0 R	15.5 R	16.0 R	15.8 F	16.1 R
Morrisons	70						
New Madrid gauge	70	11.0 R	12.4 S	12.6 to 12.8	13.0 to 13.2	13.0 S	13.0 R
Watsons	74						
Toneys	75						
Nolans	76						
Point Pleasant	80	12.5					
Linda	82	12.0		15.0			
Tiptonville	85						
Cherokee	89	13.5					
Stewarts	91						
Joe Eckles	92	15.0					
Bass	93						
Island No. 14	98	13.5					
Fritz	101	12.0		15.0	15.0	15.0	
Hathaway	103	13.5					
Bells Point	113						
Foot of Island No. 16	114						
Head of Island No. 18	118						
Cottonwood Point gauge	123	8.6 S	9.4 to 10.0	10.2 R	10.4 to 10.8	10.7 S	10.6 S
Island No. 20	125						
Foot of Island No. 20	128						
Foot of Island No. 21	131						
Wrights Point	133	16.0					
Hales Point	136						
River Styx	139						
Forked Deer	146	16.0					
O'Donnells	150						
Ashport	153						

a No bottom.

No. 4.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1907*—Continued.

ame of crossing.	Miles below Cairo.	Dates of trips.					
		Sept. 27 to Sept. 29.	Oct. 1 to Oct. 3.	Oct 8 to Oct. 10.	Oct. 11 to Oct. 13.	Oct. 15 to Oct. 16.	Oct. 18.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
t	158						
en	162	13.0			12.0	15.0	
ullerton	167	14.0			15.0	17.0	
uge	175	9.2 to 9.2	10.2 R	10.2 to 10.5	11.0 R	11.0 F	10.8 F
outh of Hatchie	178						
Point	181						
sland No. 35	193	9.5			12.0	12.5	
int	195	13.5			15.0		
	201	12.0				16.0	
	204	10.0	12.0	12.0	10.0	11.0	10.5
Old River	208	12.0					
	223	14.5					
ris	225						
an	228	12.0		14.5			
gauge	230	9.2 F	9.7 R	10.5 R	10.7 R	11.0 to 11.0	10.8 S
Presidents Island	233						
ver (below Dredge Fleet)	234						
ah	235						
Presidents Island	239						
ce or Fleeces	244	14.0					
	247						
	252						
d	254						
odes	255						
	259						
	264						
s	266						
cCulloughs Tow Head	269						
cCulloughs Tow Head	271						
	274						
oint	274						
	276						
	287						
	289						
. 60	297						
uge	306	12.7 to 12.2					
na	312	13.5					
	318						
. 63	331	15.0					
. 66	352						
s (foot)	362						
ass	385						
White River gauge	393						
oint	408						
land	425						
City gauge	438						
e	455						
	475						

TABLE No. 4.—*Depths over shoal crossings, Mississippi River below Cairo, low-water season of 1907*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.					
		Oct. 22 to Oct. 23.	Oct. 24 to Oct. 27.	Oct. 29 to Oct. 30.	Oct. 31	Nov. 2.	Nov. 2 to Nov. 4.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	14.0 F	13.5 to 11.5	10.2 F	9.8 F	9.5 S	10.0 R
Morrisons	70	.....	.....	.....	.....	.....	.....
New Madrid gauge	70	12.1 to 11.5	11.1 to 9.5	8.9 to 8.5	8.3 F	8.1 S	8.1 R
Watsons	74	.....	.....	.....	.....	.....	.....
Toneys	75	.....	.....	.....	.....	.....	.....
Nolans	76	.....	.....	.....	.....	.....	.....
Point Pleasant	80	.....	.....	.....	.....	.....	.....
Linda	82	15.0	.....	15.0	.....	.....	.....
Tiptonville	85	.....	.....	.....	.....	.....	.....
Cherokee	89	17.0	.....	.....	.....	.....	.....
Stewarts	91	.....	.....	.....	.....	.....	.....
Joe Eckles	92	13.5	.....	12.5	.....	.....	10.5
Bass	93	.....	.....	.....	.....	.....	.....
Island 14	98	15.0	.....	10.5 to 11.5	.....	.....	10.0
Fritz	101	12.5	.....	13.0	.....	.....	11.0
Hathaway	103	17.0	.....	15.0	.....	.....	13.5
Bells Point	113	.....	.....	.....	.....	.....	.....
Foot of Island 16	114	.....	.....	.....	.....	.....	.....
Head of Island 18	118	.....	.....	.....	.....	.....	.....
Cottonwood Point gauge	123	9.7 F	9.0 to 7.4	6.7 to 6.4	6.1 F	5.8 F	5.6 S
Island No. 20	125	.....	.....	.....	.....	.....	.....
Foot of Island No. 20	128	.....	.....	.....	.....	.....	.....
Foot of Island No. 21	131	.....	.....	14.0	.....	.....	13.5
Wrights Point	133	19.0	.....	13.0	.....	.....	14.0
Hales Point	136	.....	.....	.....	.....	.....	.....
River Styx	139	.....	.....	.....	.....	.....	.....
Forked Deer	146	.....	.....	16.0	.....	.....	13.0
O'Donnells	150	.....	.....	14.0	.....	.....	10.5
Ashport	153	.....	.....	.....	.....	.....	.....
Gold Dust	158	.....	.....	14.0	.....	.....	12.0
New Haven	162	14.0	.....	16.0	.....	.....	11.0
Foot of Bullerton	167	.....	.....	12.0	.....	.....	12.0
Fulton gauge	175	10.5 F	9.8 to 8.5	7.8 to 7.5	7.4 F	7.0 F	7.0 F
Above mouth of Hatchie	178	.....	.....	12.5	.....	.....	11.5
Morgans Point	181	.....	.....	16.0	.....	.....	18.0
Bend of Island No. 35	193	14.0	.....	12.5	.....	.....	11.0
Pecan Point	195	15.0	.....	11.0	.....	.....	11.0
Walts	201	.....	.....	12.0	.....	.....	11.0
Corona	204	10.0	.....	15.0	.....	.....	12.5
Mouth of Old River	208	.....	.....	13.0	.....	.....	10.5
Arthur	223	.....	.....	17.0	.....	.....	.....
Fort Harris	225	.....	.....	.....	.....	.....	.....
Paddy Hen	228	.....	.....	13.0	.....	.....	12.0
Memphis gauge	230	10.5 F	9.8 to 8.6	7.8 to 7.5	7.2 F	6.8 F	6.6 F
Head of Presidents Island	233	.....	.....	.....	.....	14.0	.....
In Old River (below Dredge Fleet)	234	.....	12.0	.....	9.0	.....	.....
Nonconnah	235	.....	.....	.....	.....	12.5	.....
Foot of Presidents Island	239	.....	.....	.....	.....	10.0	.....
Horn Lake or Fleeces	244	.....	12.0	.....	11.0	12.0	.....
Scanlans	247	.....	.....	.....	.....	.....	.....
Daisy	252	.....	12.0	.....	.....	[a] 8.5	.....
Cat Island	254	.....	.....	.....	.....	.....	.....
Harckelrodes	255	.....	15.0	.....	.....	.....	.....
Star	259	.....	.....	.....	.....	.....	.....

[a] Survey of previous day shows over 9 feet on this crossing.

). 4.—*Depth and shoal crossings, Mississippi River below Cairo, low-water season of 1907*—Continued.

ne of crossing.	Miles below Cairo.	Dates of trips.					
		Oct. 22 to Oct. 23.	Oct. 24 to Oct. 27.	Oct. 29 to Oct. 30.	Oct. 31	Nov. 2.	Nov. 2 to Nov. 4.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
.....	264	.....	16.0	.....	.....	.....	.....
.....	266	.....	.....	.....	.....	.....	.....
ulloughs Tow Head..	269	.....	13.5	.....	.....	.....	.....
ulloughs Tow Head...	271	.....	11.0	.....	.....	.....	.....
.....	274	.....	14.5	.....	.....	.....	.....
t.....	274	.....	.....	.....	.....	.....	.....
.....	276	.....	15.0	.....	.....	.....	.....
.....	287	.....	16.0	.....	.....	.....	.....
.....	289	.....	.....	.....	.....	.....	.....
).....	297	.....	.....	.....	.....	.....	.....
e.....	306	.....	13.0 F	.....	.....	.....	.....
.....	312	.....	14.0	.....	.....	.....	.....
.....	318	.....	.....	.....	.....	.....	.....
).....	331	.....	18.0	.....	.....	.....	.....
).....	352	.....	.....	.....	.....	.....	.....
oot).....	362	.....	13.5	.....	.....	.....	.....
.....	385	.....	18.0	.....	.....	.....	.....
hite River gauge.....	393	.....	17.5 F	.....	.....	.....	.....
t.....	408	.....	13.5	.....	.....	.....	.....
d.....	425	.....	16.5	.....	.....	.....	.....
y gauge.....	438	.....	15.6 to 14.1	.....	.....	.....	.....
.....	455	.....	19.0	.....	.....	.....	.....
.....	475	.....	13.0	.....	.....	.....	.....

of crossing.	Miles below Cairo.	Dates of trips.							
		Nov. 6.	Nov. 7.	Nov. 8 to Nov. 9.	Nov. 11 to Nov. 13.	Nov. 15 to Nov. 16.	Nov. 19.	Nov. 25 to Nov. 27.	Dec. 2 to Dec. 5.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
.....	0	10.3 R	10.7 R	11.3 to 12.1	13.0 to 14.8	15.5 to 16.0	18.4 R	16.3 F	19.3 to 18.1
.....	70	.....	.....	.....	.....	.....	.....	.....	.....
gauge.....	70	8.4 R	8.6 R	9.0 R	10.2 to 11.5	12.5 R	14.5 R	13.0 F	15.2 to 15.2
.....	74	.....	.....	.....	.....	.....	.....	.....	.....
.....	75	.....	.....	.....	.....	.....	.....	.....	.....
.....	76	.....	.....	.....	.....	.....	.....	.....	.....
nt.....	80	.....	.....	.....	.....	.....	.....	.....	.....
.....	82	.....	.....	.....	16.5	14.5	.....	16.0	.....
.....	85	.....	.....	.....	.....	.....	.....	.....	.....
.....	89	.....	.....	.....	.....	.....	.....	.....	.....
.....	91	.....	.....	.....	.....	.....	.....	.....	.....
.....	92	.....	.....	11.0	13.5	Upper 15 12	.....	10.5	.....
.....	93	.....	.....	.....	.....	.....	.....	.....	.....
4.....	98	.....	.....	12.0	15.0	16.0	.....	15.5	.....
.....	101	.....	.....	12.0	14.0	16.0	.....	16.0	.....
.....	103	.....	.....	16.0	.....	16.0	.....	18.0	.....
.....	113	.....	.....	.....	.....	.....	.....	.....	.....
nd No. 16.....	114	.....	.....	.....	.....	.....	.....	.....	.....
nd No. 18.....	118	.....	.....	.....	.....	.....	.....	.....	.....
Point gauge..	123	5.7 R	5.8 R	6.2 R	7.2 to 8.4	9.4 to 10.0	11.3 R	10.5 F	12.0 to 12.9
).....	125	.....	.....	.....	.....	.....	.....	.....	.....
nd No. 20.....	128	.....	.....	.....	.....	.....	.....	.....	.....

TABLE No. 3.—Cost of dredging operations May 1, 1907, to April 30, 1908.

	Labor.	Office supplies.	Subsistence.	Fuel.	Lighting supplies.	Lubricants.	Materials.	New plant.	Total.	Grand total.
Care of plant	$35,708.87	$180.13	$8,226.63	$9,553.48	$77.08	$83.46	$607.93			$54,437.58
Repairs to floating plant:										
Dredge Beta	3,780.40		901.34		23.80	24.09	370.19		$5,099.82	
Dredge Gamma	744.06		179.75		.79	.98	147.52		1,073.10	
Dredge Delta	1,368.12		273.41		1.19	2.63	300.84		1,946.19	
Dredge Epsilon	510.36		106.04		1.43	2.34	112.96		733.13	
Dredge Zeta	2,115.48		420.59	634.74	3.75	22.26	132.60		3,329.42	
Dredge Iota	3,748.58		835.24	491.11	5.57	80.38	451.75		5,648.63	
Dredge Kappa	2,194.49		475.85		.92	43.76	625.78		3,340.80	
Dredge Henry Flad	1,526.50		336.37		1.87	43.50	201.30		2,109.54	
Dredge Henry Flad (reconstruction)	3,111.55		689.82		.85	157.23	304.40		4,263.85	
Dredge B. M. Harrod	3,255.02		627.60	139.98	1.70	17.90	189.51		4,231.71	
Steamer Sachem	1,728.49		390.37		2.10	11.70	605.68		2,738.34	
Steamer Choctaw	1,345.51		284.04	476.93	2.24	4.44	224.45		2,337.61	
Steamer Nokomis	871.64		176.68		.90	33.34	233.20		1,315.76	
Steamer Wynoka	306.89		60.53		1.89	52.77	275.38		697.46	
Steamer Leota	2,295.89		458.00	634.67	3.48	133.23	212.77		3,738.04	
Steamer Minnetonka	28.99		5.57			1.89			36.45	
Steamer Search	821.17		169.72		3.65	11.76	95.58		1,101.88	
Steamer Vulcan	1,726.39		334.53		.97	16.81	389.17		2,467.87	
Steamer Venus	953.13		191.11	12.00	3.38	27.07	171.23		1,357.92	
Steamer Mars	1,080.92		237.09	5.00	.57	9.65	161.53		1,494.76	
Steamer Mercury	248.48		52.29		.59	1.86	80.87		384.09	
Pile sinker No. 971	4.32		1.26						5.58	
Pile sinker No. 981	98.08		23.02				17.96		139.06	
Pile sinker No. 982	73.68		16.70		.05		.40		90.83	
Pile sinker No. 983	91.56		19.29		.13		7.45		118.43	
Pile sinker No. 984	116.78		23.78			.81	22.49		163.86	
Skiffs	49.39		7.03				5.54		61.96	
Pump boat	66.02		16.11		.06	1.46	5.58		89.23	
Sectional docks	355.93		65.03		.09	.10	48.30		469.45	
Total	34,653.82		7,378.16	2,394.43	61.97	701.96	5,394.43		50,584.77	50,584.77
Operations during low-water season, 1907:										
Dredge Beta	8,878.42	9.66	1,828.84	9,169.22	41.40	417.88	1,149.33		21,494.75	
Dredge Epsilon	4,244.39	4.08	1,020.75	1,688.68	14.41	69.89	381.75		7,413.95	
Dredge Zeta	1,990.86	4.26	439.91	1,008.79	17.97	46.68	87.66		3,596.13	
Dredge Iota	6,089.13	9.13	1,511.00	3,069.33	36.10	42.77	230.67		10,988.13	
Dredge Kappa	7,706.32	6.91	1,654.92	3,186.01	36.59	121.62	487.02		13,199.39	
Dredge Henry Flad	6,723.92	9.02	1,481.32	3,322.02	34.84	137.36	452.17		12,160.65	
Dredge B. M. Harrod	5,507.15	5.87	1,261.34	4,736.67	36.75	172.80	672.41		12,392.99	

TABLE No. 4.—*Depth and shoal crossings, Mississippi River below Cairo, low-water season of 1907*—Continued.

Name of crossing.	Miles below Cairo.	Dates of trips.							
		Nov. 6.	Nov. 7.	Nov. 8 to Nov. 9.	Nov. 11 to Nov. 13.	Nov. 15 to Nov. 16.	Nov. 19.	Nov. 25 to Nov. 27.	Dec. 2 to Dec. 5.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Foot of Island No. 21	131	.....	.....	15.0	.....	18.0	.....	19.0	.....
Wrights Point	133	.....	.....	16.0	.....	17.5	.....	18.0	.....
Hales Point	136	.....	.....	.....	.....	17.0	.....	16.0	.....
River Styx	139	.....	.....	.....	.....	.....	.....	.....	.....
Forked Deer	146	.....	.....	13.0	.....	.....	.....	.....	.....
O'Donnells	150	.....	.....	12.0	.....	17.5	.....	18.0	.....
Ashport	153	.....	.....	.....	.....	.....	.....	.....	.....
Gold Dust	158	.....	.....	14.0	.....	15.5	.....	20.0	.....
New Haven	162	.....	.....	12.0	15.0	15.5	.....	18.0	.....
Foot of Bullerton	167	.....	.....	14.0	15.0	15.0	.....	19.5	.....
Fulton gauge	175	6.9 R	7.0 R	7.1 R	8.0 to 8.8	10.0 R	11.2 R	11.0 F	11.8 to 12.9
Above mouth of Hatchie	178	.....	.....	11.0	.....	16.0	.....	15.0	.....
Morgans Point	181	.....	.....	.....	.....	.....	.....	.....	.....
Bend of Island No. 35	193	.....	.....	14.0	15.0	15.0	.....	15.0	.....
Pecan Point	195	10.5	.....	10.0	12.5	15.0	.....	16.0	.....
Walts	201	11.0	.....	12.5	.....	16.0	.....	16.0	.....
Corona	204	12.0	.....	13.0	13.5	16.0	14.5	16.0	.....
Mouth of Old River	208	10.0	.....	9.5	.....	13.0	.....	18.0	.....
Arthur	223	14.0	.....	.....	.....	.....	.....	.....	.....
Fort Harris	225	.....	.....	.....	.....	.....	.....	.....	.....
Paddy Hen	228	15.0	.....	.....	.....	.....	.....	.....	.....
Memphis gauge	230	6.5 S	6.5 S	6.7 R	8.0 R	9.0 R	10.7 R	11.0 R	11.7 R
Head of Presidents Island	233	.....	14.0	.....	.....	.....	.....	.....	.....
In Old River (below Dredge Fleet)	234	.....	.....	.....	.....	.....	.....	.....	.....
Nonconnah	235	.....	13.0	.....	.....	.....	.....	.....	.....
Foot of Presidents Island	239	.....	11.0	.....	.....	.....	.....	.....	.....
Horn Lake or Fleeces	244	.....	10.5	.....	14.0	.....	.....	.....	.....
Scanlans	247	.....	.....	.....	.....	.....	.....	.....	.....
Daisy	252	.....	10.5	.....	13.0	.....	.....	.....	.....
Cat Island	254	.....	.....	.....	.....	.....	.....	.....	.....
Harckelrodes	255	.....	15.0	.....	.....	.....	.....	.....	.....
Star	259	.....	.....	.....	.....	.....	.....	.....	.....
Polks	264	.....	9.5	.....	.....	.....	.....	.....	.....
Commerce	266	.....	.....	.....	.....	.....	.....	.....	.....
Head of McCulloughs towhead	269	.....	12.0	.....	.....	.....	.....	.....	.....
Foot of McCulloughs towhead	271	.....	12.0	.....	.....	.....	.....	.....	.....
Foxburns	274	.....	.....	.....	.....	.....	.....	.....	.....
Ashley Point	274	.....	.....	.....	.....	.....	.....	.....	.....
Mhoons	276	.....	.....	.....	.....	.....	.....	.....	.....
Hardins	287	.....	.....	.....	.....	.....	.....	.....	.....

Name of crossing.	Miles below Cairo.	Dates of trips.							
		Dec. 7 to Dec. 9.	Dec. 11.	Dec. 13 to Dec. 15.	Dec. 17.	Dec. 18.	Dec. 21 to Dec. 23.	Dec 23.	Feb. 5 to Feb. 7, 1908.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Cairo gauge	0	16.3 to 14.0	12.9 F	12.0 F	13.5 R	14.1 R	18.1 to 20.5	20.5 R	17.3 to 23.1
Morrisons	70	.....	.....	.....	.....	.....	.....	.....	.....
New Madrid gauge	70	13.8 to 11.8	10.7 F	9.8 F	10.3 R	10.9 R	13.8 to 16.4	16.4 R	17.0 R
Watsons	74	.....	.....	.....	.....	.....	.....	.....	.....
Toneys	75	.....	.....	.....	.....	.....	.....	.....	.....
Nolans	76	.....	.....	.....	.....	.....	.....	.....	.....
Point Pleasant	80	.....	.....	.....	.....	.....	.....	.....	.....
Linda	82	.....	.....	16.5	.....	.....	20.5	.....	21.5
Tiptonville	85	.....	.....	.....	.....	.....	.....	.....	.....

No. 4.—*Depths and shoal crossings, Mississippi River below Cairo, low-water season of 1907*—Continued.

ne of crossing.	Miles below Cairo.	Dates of trips.							
		Dec. 7 to Dec. 9.	Dec. 11.	Dec. 13 to Dec. 15.	Dec. 17.	Dec. 18.	Dec. 21 to Dec. 23.	Dec. 23.	Feb. 5 to Feb. 7, 1908.
		Feet.	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Feet.*
.....	89	.....	.....	.....	.....	.....	.....	.....	.....
.....	91	.....	.....	.....	.....	.....	.....	.....	.....
s.....	92	.....	.....	11.0	.....	.....	18.0	.....	16.0
.....	93	.....	.....	.....	.....	.....	.....	.....	.....
o. 14.....	98	17.5	.....	14.0	.....	.....	18.0	.....	19.0
.....	101	18.5	.....	19.0	.....	.....	19.5	.....	24.0
y.....	103	21.0	.....	16.5	.....	.....	.....	.....	23.0
nt.....	113	.....	.....	.....	.....	.....	.....	.....	.....
Island No. 16.....	114	.....	.....	.....	.....	.....	.....	.....	.....
Island No. 18.....	118	.....	.....	.....	.....	.....	.....	.....	.....
ood Point gauge....	123	10.7 F	8.6 F	7.5 F	7.4 R	7.8 R	10.5 R	13.1 R	13.0 R
o. 20.....	125	.....	.....	.....	.....	.....	.....	.....	.....
sland No. 20.....	128	.....	.....	.....	.....	.....	.....	.....	.....
sland No. 21.....	131	19.5	.....	20.0	.....	.....	.....	.....	20.0
Point.....	133	20.5	.....	16.0	.....	.....	.....	.....	(a)
int.....	136	16.5	.....	.....	.....	.....	.....	.....	.....
rx.....	139	.....	.....	.....	.....	.....	.....	.....	.....
eer.....	146	.....	.....	15.0	.....	.....	.....	.....	.....
ls.....	150	.....	.....	.....	.....	.....	.....	.....	.....
.....	153	.....	.....	.....	.....	.....	.....	.....	.....
t.....	158	.....	.....	17.0	.....	.....	.....	.....	.....
en.....	162	.....	.....	15.0	.....	.....	16.5	.....	17.5
ullerton.....	167	18.0	.....	16.0	.....	.....	18.5	.....	20.0
uge.....	175	12.0 F	9.4 F	8.5 F	8.2 R	8.5 R	10.2 to 11.2	12.1 R	12.0 R
outh of Hatchie....	178	16.0	.....	16.0	.....	.....	.....	.....	.....
Point.....	181	.....	.....	.....	.....	.....	.....	.....	.....
sland No. 35	193	14.5	15.0	16.0	.....	17.5	20.0	.....	13.5
int.....	195	15.5	.....	15.0	.....	12.0	20.0	.....	13.5
.....	201	18.0	.....	13.5	.....	12.5	16.0	.....	17.0
.....	204	16.0	14.0	.....	.....	13.0	17.0	.....	(b) 11.0 (c) 18.0
Old River.....	208	19.0	.....	12.0	.....	12.0	13.5	.....	.....
.....	223	.....	.....	.....	.....	.....	.....	.....	.....
ris.....	225	.....	.....	.....	.....	.....	.....	.....	.....
en.....	228	.....	.....	.....	.....	.....	.....	.....	(a)
gauge.....	230	11.2 to 11.0	9.7 F	8.4 to 7.8	7.7 R	8.0 S	9.4 to 11.4	11.5 R	10.4 to 11.6
Presidents Island...	233	.....	.....	.....	.....	.....	.....	.....	.....
iver (below dredge	234	.....	.....	.....	.....	.....	.....	.....	.....
ah.....	235	.....	.....	.....	10.5	.....	.....	.....	.....
residents Island ...	239	.....	.....	.....	11.0	.....	.....	.....	.....
ke or Fleeces	244	.....	.....	.....	14.0	.....	.....	15.5	.....
.....	247	.....	.....	.....	.....	.....	.....	.....	.....
.....	252	.....	.....	.....	10.0	.....	.....	17.0	.....
d.....	254	.....	.....	.....	.....	.....	.....	.....	.....
odes.....	255	.....	.....	.....	.....	.....	.....	.....	.....
.....	259	.....	.....	.....	.....	.....	.....	.....	.....
.....	264	.....	.....	.....	.....	.....	.....	.....	.....
e.....	266	.....	.....	.....	.....	.....	.....	.....	.....
McCulloughs Tow	269	.....	.....	.....	.....	.....	.....	.....	.....
McCulloughs Tow	271	.....	.....	.....	.....	.....	.....	.....	.....
s.....	274	.....	.....	.....	.....	.....	.....	.....	.....
oint.....	274	.....	.....	.....	.....	.....	.....	.....	.....
.....	276	.....	.....	.....	.....	.....	.....	.....	.....
.....	287	.....	.....	.....	.....	.....	.....	.....	.....

a No bottom. b Upper channel. c Lower channel.

TABLE No. 5.—*Summary of dredging operations, Mississippi River below Cairo, during the low-water season of 1907.*

BETA.

Points of operation.	Distribution of time.									Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Average depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.								
	Hours.	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Hours.*	*Miles.*		*Feet.*	*Feet.*	*Feet.*	*Feet.*	*Lbs.*	
Corona (204):																	
Oct. 15–Nov. 18	26.30	247.00	40.30	234.30	.....	.....	28.30	263.00	840.00	31	17	17,820	72.1	19.0	7.13	139	120
Nov. 19–24 (second time)	2.40	34.45	2.10	.....	.....	.....	.....	104.25	144.00	.....	3	3,020	86.9	20.0	8.61	144	123
Nov. 25–Dec. 8 (third time)	9.05	130.45	12.35	3.35	.....	.....	.....	180.00	336.00	.....	6	6,580	50.3	23.5	10.49	144	123
Dec. 9–27 (fourth time)	6.00	252.55	36.25	15.30	.....	.....	.....	127.40	438.30	.....	26	22,000	87.0	19.5	6.53	150	127
Going into winter quarters, Dec. 27	.....	.....	.....	.....	.....	5.30	4.00	.....	9.30	31	.....	.....	.....	.....	.....	.....	.....
Total and average	44.15	665.25	91.40	253.35	.....	5.30	32.30	675.05	1,768.00	62	52	49,420	74.3	22.0	7.40	144	123

IOTA.

Points of operation.	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.	Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Average depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
Opposite dredge fleet (232), Oct. 5–25	.....	.....	.....	.....	.....	.....	.....	493.00	493.00	.....	.....	.....	.....	.....	.....	.....	.....
Horn Lake or Fleeces (244), Oct. 25–Nov. 3	4.30	39.25	2.25	1.30	.....	4.00	2.30	156.00	210.20	11	6	4,000	101.5	17.0	4.65	132	140
Daisy (252), Nov. 3–Dec. 24	3.20	44.20	3.30	6.15	0.25	.....	2.00	1,163.15	1,223.05	7	8	6,225	140.4	16.0	5.16	139	142
Going into winter quarters, Dec. 24–25	.....	.....	.....	.....	.....	.....	32.20	.....	32.20	18	.....	.....	.....	.....	.....	.....	.....
Total and average	7.50	83.45	5.55	7.45	0.25	4.00	36.50	1,812.15	1,958.45	36	14	10,225	122.1	16.5	4.96	136	141

KAPPA

Points of operation.	Placing plant.	Dredging.	Changing cuts.	Repairing.	Passing boats.	Making up tow.	Towing.	Not working, awaiting lower stage, etc.	Total.	Distance towed.	Number of cuts.	Total length of cuts.	Average rate of advance per hour.	Average depth suction lowered.	Average depth of cut.	Average steam pressure per square inch.	Average speed main pump, revolutions per minute.
Linda (82):																	
Sept. 7–Oct. 28	1.45	59.30	5.15	8.30	.....	4.00	160.15	1,008.45	1,248.00	151	8	7,600	128.0	18.0	2.64	142	126
Oct. 29–Nov. 1 (second time)	1.30	67.20	5.30	.....	.....	.....	.30	8.15	83.05	.....	10	9,625	142.9	17.5	3.67	139	128
Joe Eckles (92), Nov. 1–9	.....	.....	.....	.....	.....	3.25	2.30	186.15	192.10	9	.....	.....	.....	.....	.....	.....	.....
Linda (82), Nov. 9–Dec. 25 (third time)	[illegible]	[illegible]	5.15	0.30	.....	1.30	6.45	1,051.45	1,131.30	9	11	9,650	148.5	18.0	4.33	136	126

HENRY FLAD.

Corona (204), Sept. 21-30	11.15	114.20	8.05	.....	.....	1.00	25.35	60.45	221.00	31	14	10,925	95.6	16.0	7.11	131	128
Island 35 (193):																	
Sept. 30-Oct. 17	0.45	55.05	3.50	12.40	.....	2.10	6.40	345.50	427.00	10	10	7,775	141.2	16.0	5.89	132	128
Oct. 18-25 (second time)	1.00	106.50	8.35	3.20	0.15	0.15	1.00	53.30	174.45	2	19	13,500	126.4	18.0	5.72	133	128
Corona (204), Oct. 25-Nov. 2, (second time)	0.30	14.35	0.40	.....	.....	.....	4.05	171.10	191.00	15	3	2,250	154.3	11.0	2.87	133	128
Island 35 (193):																	
Nov. 2-Dec. 11 (third time)	0.45	100.45	8.55	3.30	.....	1.00	7.00	862.05	984.00	11	14	12,750	126.6	18.0	5.34	132	126
Dec. 12-27 (fourth time.)	0.20	133.40	10.05	5.00	.....	.....	2.25	214.30	366.00	2	20	18,075	135.2	18.5	4.36	135	128
Going into winter quarters, Dec. 27	.....	.....	.....	.....	.....	1.40	4.50	.....	6.30	41	.....	.....	.....	.....	.....	.....	.....
Total and average	14.35	525.15	40.10	24.30	0.15	6.05	51.35	1,707.50	2,370.15	112	80	65,275	124.3	17.5	5.42	133	128

B. M. HARROD.

Corona (204):																	
Sept. 11-30	26.35	112.45	4.30	3.00	.....	8.30	20.30	304.10	480.00	31	9	11,400	101.1	16.0	5.71	148	137
Oct. 1-14 (second time)	3.30	37.20	1.00	[a]186.40	.....	.....	.....	89.30	318.00	.....	4	3,200	85.7	16.0	5.64	139	140
Going into winter quarters, Oct. 14-15	.....	.....	.....	.....	.....	4.00	[b]23.00	.....	27.00	[b]47	.....	.....	.....	.....	.....	.....	.....
Total and average	30.05	150.05	5.30	189.40	.....	12.30	43.30	393.40	825.00	78	13	14,600	90.6	16.0	5.70	145	138

[a] 168 hours of this time on repairs and alterations shown to be necessary as result of test.
[b] Includes speed test of propelling engines.

NOTE.—The dredges Epsilon and Zeta were also in commission, the Epsilon from November 4 to December 22, 1907, and the Zeta from November 4 to 22, 1907, but no dredging was required of either of these dredges during the season.

APPENDIX 1 A.

LAWS AFFECTING THE MISSISSIPPI RIVER COMMISSION, JULY 1, 1907, TO JUNE 30, 1908.

[PUBLIC—NO. 141.]

[H. R. 21260.]

AN ACT Making appropriations for sundry civil expenses of the Government for the fiscal year ending June thirtieth, nineteen hundred and nine, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the following sums be, and the same are hereby, appropriated, for the objects hereinafter expressed, for the fiscal year ending June thirtieth, nineteen hundred and nine, namely:

* * * * * * *

Improving Mississippi River: For continuing improvement of Mississippi River from Head of Passes to the mouth of the Ohio River, including salaries and clerical, office, traveling, and miscellaneous expenses of the Mississippi River Commission, two million dollars.

* * * * * * *

Approved, May 27, 1908.

APPENDIX 2.

REPORT OF CAPT. WM. D. CONNOR, CORPS OF ENGINEERS, ON OPERATIONS IN THE FIRST AND SECOND DISTRICTS.

UNITED STATES ENGINEER OFFICE,
Memphis, Tenn., June 1, 1908.

COLONEL: I have the honor to submit the following report of operations in the first and second districts, Mississippi River improvement, for the year ending May 31, 1908.

The first district extends from Cape Girardeau, Mo., to the foot of Island 40, a distance of 270 miles. Operations in this district include bank protection work at Columbus and Hickman, Ky., and at New Madrid and Caruthersville, Mo.; systematic improvement of Plum Point reach, Tennessee and Arkansas; abattis dike work; levee work in the upper St. Francis and Reelfoot levee districts, and in the lower St. Francis levee district to the milepost 139/140.

The second district extends from the foot of Island 40 to the mouth of White River (393 R.), a distance of 173 miles, excepting on the left bank, where it ends at the Coahoma-Bolivar county line (365 L.). Operations in this district include revetment work at Memphis, Tenn., Hopefield Bend and Helena, Ark.; the improvement of Wolf River, Tennessee, bank protection in Walnut Bend and in Old Town Bend, levee work in the White River and the upper Yazoo levee districts, and in the lower St. Francis levee district south of milepost 139/140.

PART I.—CHANNEL WORK.

STONE SUPPLY.

The stone for the works in the first and second districts this year was procured from the same general sources, as follows: 15,026.9 cubic yards of stone and 2,446.45 cubic yards of spalls delivered on Government barges at quarries opposite Grand Tower, Ill., for 87 cents and 75 cents a cubic yard, respectively; 9,094.57 cubic yards of stone delivered on cars at quarries in the vicinity of Little Rock, Ark., from where it was shipped to Hopefield, Ark., and then distributed to the different works as needed; 4,663.8 cubic yards of Ohio River stone delivered on contractors' barges at Walnut Bend and at Old Town Bend at $2.25 a cubic yard, and 1,473 cubic yards of stone borrowed from the third district at Greenville. Of the stone procured at Grand

ower, 366 cubic yards of stone were lost by the sinking of a barge at Fillmore (3 L.); 0.75 cubic yards of spalls were lost by the sinking of a barge near Commerce, Mo., and 7 cubic yards are now stored on barges at Santa Fe, Ill., with the fleet belonging to e St. Louis district. The distribution of the stone and its costs are shown in the bles following:

Grand Tower stone (15,026.9 cubic yards stone; 2,446.45 cubic yards spalls).

	Purchase rate a cubic yard.	Towage rate a cubic yard to where used.	Cost a cubic yard on barge where used.	Quantity (cubic yards).	Total cost.
				Stone.	
nta Fe fleet	$0.87	$0.359	$1.229	507.00	$623.09
llmore	.87	.2890	1.1590	366.00	424.19
etcher Bend	.87	.8092	1.6792	563.70	946.57
opefield Bend	.87	1.0606	1.9306	5,115.10	9,875.21
alnut Bend	.87	1.2308	2.1008	1,778.80	3,736.90
ld Town Bend	.87	1.3770	2.2470	6,696.30	15,046.59
				Spalls.	
mmerce	.75	.3023	1.0523	330.75	347.50
alnut Bend	.75	1.2308	1.9808	854.60	1,692.79
ld Town Bend	.75	1.3770	2.1270	1,261.10	2,683.36

Little Rock stone (9,094.57 cubic yards).

	Value on cars at Hopefield.	Unloading from cars.	Loading on barges.	Towage to place where used.	Cost on barge where used.	Quantity (cubic yards).	Total cost.
opefield	$1.175	$0.1704	$0.5557	.....	$1.9011	1,000.0	$1,901.10
Do	1.175	.1704	.484	.....	1.8294	1,490.0	2,715.81
alnut Bend	1.175	.1704	.484	$0.1802	2.0696	993.0	1,995.53
Do	1.175	.1704	.389	.1802	1.9146	2,293.4	4,390.94
ld Town Bend	1.175	.1704	.389	.3264	2.0608	200.0	412.16
emphis fleet	1.175	.132	.389	.....	[a] 1.696	1,200.0	2,035.20
n bank, Hopefield	1.175	.132	.....	.....	[b] 1.307	1,918.17	2,507.04

[a] Stored on barges at Memphis fleet.
[b] Stored on bank at Hopefield.

hio River stone:

682.5 cubic yards delivered on barges at Walnut Bend, at $2.25 ..... $1,545.62
3,981.3 cubic yards delivered on barges at Old Town Bend, at $2.25... 8,957.92

reenville stone:

Loading on barges, $0.354 a cubic yard.
Towage to Old Town Bend, $0.527 a cubic yard.
1,473 cubic yards on barges at Old Town, at $0.881..... 1,297.71

BRUSH SUPPLY.

The brush and poles for the two districts were purchased, delivered on government arges, at the rate of $1.26 and $2 a cord, respectively. Deliveries were made at vari- s localities between Island No. 40 (215) and Helena (306 R.), from where the mate- al was towed to the several works by Government boats.

FIRST DISTRICT (CAPE GIRARDEAU, MO., TO FOOT OF ISLAND 40, 270 MILES).

Columbus, Ky. (21 L.).—(For description and previous history, see the general sum- ary for this report and page 3580, Report of Chief of Engineers, 1891. For last map, e map No. 1, Appendix 2, Report of Chief of Engineers, 1905, Supplement.) Special ppropriation.

Hickman, Ky. (36 L.).—(For references to previous history, see the general summary r this report and page 152, Report of Chief of Engineers, 1905, Supplement. For st map, see map No. 2, Report of Chief of Engineers, 1905, Supplement, Appendix .) Special appropriation.

Slough Landing Neck, Tenn. (60 L.).—The river threatens to make a cut-off in this ocality and the width of the neck has been reduced to 8,000 feet. The distance by

river around the neck is about 12 miles. Apparently steps must be taken within the next three years to stop the caving on both sides of the neck if the cut-off is to be prevented, and that it must be prevented is admitted, since a cut-off here would disturb the present settled regimen for many miles up and down stream. Map No. 1 accompanying this report shows the present conditions.

New Madrid, Mo. (*71 R.*).—(For references to previous history, see the general summary for this report and page 152, Report of Chief of Engineers, 1905, Supplement.) Special appropriation.

Caruthersville, Mo. (*110 R.*).—(For references to previous history, see the general summary for this report and page 2676, Report of Chief of Engineers, part 3, 1907. For last map, see map No. 4, Report of Chief of Engineers, 1905, Supplement, Appendix 2.) There is a small break in the revetment that will be repaired during the coming season, circumstances permitting.

Chute of Island 26, (*150 L.*).—For several years there has been an increasing tendency for this chute to enlarge and for the main flow of the river to go to the left of the island, a condition which would cause a radical change in the regimen of the river through Plum Point reach. To prevent this change it was purposed to close this chute by means of an abattis dike during the season just passed. Material for this work was purchased, but the available plant was kept busy at other localities until the high-water season was at hand and construction work had to be suspended. The material purchased is now stored at Memphis and at the Santa Fe, Ill., fleet of the St. Louis district. The expenditures in connection with this work this year are as follows:

Stock on hand:	
Labor and subsistence unloading and storing lumber	$83.98
Lumber	552.70
Wire, strand, clips, and staples	122.99
Stone (at Santa Fe, Ill.), 507 cubic yards, at $1.229	623.09
Coal, 5,000 bushels, at 11.5 cents	575.00
Value of material on hand at end of year	1,957.76
Surveys	441.18
Total	2,398.94

PLUM POINT REACH (147 TO 168 MILES BELOW CAIRO).

(For last map, see Report of Chief of Engineers, 1905, Supplement, Appendix 2, map No. 5. For statement regarding existing works and their effects upon the river channels, see general summary of this report.) Maps Nos. 2, 3, and 4, forwarded herewith, show the present conditions.

The works of improvement in this reach extend from above Daniels Point to near Craighead Point, Arkansas, a distance of about 17 miles (151–168). These operations were begun in 1882 and have been fully described in subsequent reports. In general terms the work done has been the closure of Osceola and Bullerton chutes by pile dikes; the partial closure of Gold Dust Chute by pile dikes and a brush and stone dam; the contraction of the low-water channel by dikes at Ashport bar, Elmot bar, and Plum Point; the revetment of caving banks above Daniels Point, throughout Ashport and Fletchers bends, along a part of the fronts of Osceola and Bullerton bars, at Plum Point and near Craighead Point, and the construction of levees along both banks of the river.

Details of the work are as follows:

Daniels Point, Arkansas (*152 R.*)—(For description, previous history, and last map, see Report of Chief of Engineers, 1905, Supplement, p. 153.) The present effective continuous revetment at this point is 5,400 feet long, of which the upper 5,000 feet is of fascine mattresses and the lower 400 feet is of dikes and small fascine mattresses. About 2,000 feet below the lower end of this work are some small detached fascine mattresses and one dike. During the coming season it is proposed to reenforce both ends of this last-mentioned piece in order to hold the point and prevent the enlargement of this chute behind Ashport bar.

Ashport Bend, Tennessee (*155 L.*).—(For references to previous history and for last map, see Report of Chief of Engineers, 1905, Supplement, p. 153.) There are some small breaks in this work that should be repaired during the coming season.

Fletchers Bend, Arkansas (*158–161 R.*).—(For references to previous history and for last map, see Report of Chief of Engineers, 1905, Supplement, p. 153, and subsequ

reports.) The work done in this locality this year repaired all the breaks of any importance. There remains considerable work to be done in the way of replacing mattresses exposed at low stages, with standard pavement and in paving some stretches of bank that have never been paved. The work done in this locality this year was that of building four stone dikes on brush foundations at places where benches had been scoured along the upper edge of the paving. These dikes were as follows:

Station 177.—Stone and brush dike, 100 feet long, 4½ to 5 feet high; width of crown, 3 feet; side slopes, 2 on 3. All the dikes are of the same cross section as this one.

Station 179.—Stone and brush dike, 125 feet long.

Station 200.—Stone and brush dike, 40 feet, with 75 feet by 40 feet of bank mattress paved.

Station 216.—Stone and brush dike, 75 feet long.

The plant was taken to this locality from Memphis, August 24, 1907, and was returned to Memphis September 9, 1907. The expenditures on this work were:

Stone, 563.7 cubic yards, at $1.6792	$946.57	
Brush, 132 cords, at $1.26	166.22	
Poles, 27.7 cords, at $2	55.40	
No. 12 wire, 500 pounds, at $2.495 a cwt	12.47	
Total material		$1,180.66
Steamboat expense		240.70
Labor, subsistence, and supervision		1,229.70
Total field cost		2,651.06
Material on hand at close of season	186.47	
Office expenses	132.35	
Surveys	567.25	
Repairs to plant	350.86	
Care of plant	13.92	
Depreciation of plant	281.32	
		1,532.17
Total		4,183.23

Osceola bars (163–165 R.).—(These were formerly referred to as upper, middle, and lower Osceola bars. For references to previous history, see those headings in Report of Chief of Engineers, 1907, p. 2678.) The upper and middle bars have practically disappeared, and the lower bar is caving rapidly. The river at the upper end of this bar has reached the old main bank, which also is caving. This caving threatens to break the levee, which is now only 400 feet distant, and to injure the town of Osceola. It is purposed to revet about 2,500 feet of bank in the vicinity of the threatened levee during the coming season. Map No. 5, forwarded herewith, shows the present conditions.

Bullerton bar (168 R.).—(This was formerly reported under the heading "Lower Osceola and Bullerton bars," Arkansas. For references to previous history, see that heading in Report of Chief of Engineers, 1907, p. 2678.) Some minor repairs are needed. These are to be made at the first convenient opportunity.

SECOND DISTRICT (FOOT OF ISLAND 40 TO WHITE RIVER, 173 MILES).

Hopefield Bend (227–230 R.).—(For description and previous history and references thereto, see Report of Chief of Engineers, 1907, p. 2678. For last map, see Report of Chief of Engineers, 1905, Supplement.) Map No. 6, forwarded herewith, shows the present conditions. The condition of this work at the beginning of the season just passed was as follows: From station 44 W., the upper limit of the work, to about station zero, bank paving had been brought up to a little over two-thirds bank height; from station 18 W. to 12 W., and from 2 W. to 2 E., high water had caused some surface scour on top of the bank; at station 38 W. to 35 W. a bench had been eroded along the inner edge of the mattress work; from station 48 E. on down to station 90 E. there were several breaks in the paving near ordinary low water, and between station 90 E. and 98 E. the revetment had been destroyed and a large pocket eroded in the bank, whereby the stability of the lower end of the work was endangered. The necessary plant for making repairs was moved to this point August 1, 1907. Pending the arrival

of brush for use in mattress building the force of employees was engaged at paving the upper portions of the bank along the upstream end of the work. This and other minor repairs were carried forward along with the extensive repairs made between stations 90 E. and 98 E. (the vicinity of the railway incline) whenever it was possible to do so without delaying the latter work. Upon completion of the mattress construction, the mattress plant was sent to Walnut Bend November 4, 1907, a small force being retained at Hopefield to complete the bank paving. The season's work ended December 16, 1907. The work done during the season was as follows:

Minor repairs.

Station 38+60 W. to 35 W.:
- Bank graded, 360 linear feet, equaling 3,025 cubic yards of earth.
- Bank paved, 1,448 square yards.
- Connecting mattress No. 44 (85 feet by 284 feet, equaling 241.4 squares) built. The upstream edge of this mattress is at station 37+75 W.

Station 34+50 W. to 31+50 W.:
- Upper shoulder of bank graded, 300 linear feet, equaling 300 cubic yards.
- Gravel spread for foundation for paving, 200 square yards.
- Bank paved, none.

Station 21+50 W. to 15+50 W.:
- Upper shoulder of bank graded, 600 linear feet, equaling 600 cubic yards.
- Gravel spread for foundation for paving, 600 square yards.
- Bank paved, 951.6 square yards.

Station 16 W.:
- One rock embankment on brush foundation built across depression caused by surface scour. Dimension of embankment, 80 feet long; maximum height, 4 feet.

Station 14+12 W.:
- One rock embankment on brush foundation built across depression caused by surface scour. Dimension of embankment, 75 feet long; maximum height, 4½ feet.

Station 6+19 W. to 1+07 W.:
- Upper shoulder of bank graded, 512 linear feet, equaling 500 cubic yards.
- Gravel spread for foundation for paving, 555.6 square yards.
- Bank paved (6+19 W. to 4 W. only), 951.6 square yards.

Station zero to 1+50 E.:
- Upper shoulder of bank graded, 150 linear feet, equaling 100 cubic yards.
- Gravel spread for foundation for paving, 66.7 square yards.
- Bank paved, 89 square yards.

Station 20+30 E. to 21 E.:
- Upper shoulder of bank graded, 70 linear feet.

Pocket at station 51 E. (includes station 50 E. to 53 E.):
- Upper shoulder of bank graded, 230 linear feet, equaling 490 cubic yards.
- Gravel spread for foundation for paving, 415.6 square yards.
- Sill mattress or brush flooring for paving, 62.5 squares.
- Bank paved, 2,035.6 square yards.

Station 26 E. to 27 E.:
- Bank paved, 207 square yards.

Station 55 E.:
- Bank paved, 390 square yards.

Station 66 E. (not completed):
- Bank paved, 194.4 square yards.

Station 89 E.:
- Bank paved, 71.1 square yards.

Extensive repairs.

Station 90 E. to 100 E. (Hopefield pocket):
- Bank graded, 930 linear feet, equaling 3,945 cubic yards.
- Gravel spread for foundation for paving, 6,773.7 square yards.
- Bank paved, 9,837.2 square yards.
- Channel mattress No. 13 (254 feet by 961 feet equaling 2,440.9 squares) built.
- Connecting mattress No. 41 (280 feet by 284 feet equaling 795.2 squares) built.
- Connecting mattress No. 42 (220 feet by 284 feet equaling 624.8 squares) built.
- Connecting mattress No. 43 (84 feet by 204 feet equaling 171.4 squares) built.

Some further repairs are needed to the works in this bend. During the past year the main channel has cut across the bar and no longer follows the bend past Mound City, but now impinges directly on to station 0 (about 4,400 feet below the head of the revetment work). Because of this change in the direction of the approach of the channel it

posed to confine the repairs during the coming season to points below station *. ost of the work done this year is as follows:

Cost of minor repairs.

ng, 1,222 linear feet, equaling 5,200 cubic yards:	
oal	$85.30
ils, waste, and sundries	10.45
abor, subsistence, and supervision	493.16
	588.91
Cost per linear foot, $0.482—.	
Cost per cubic yard, $0.113+.	
ıg, 5,582.3 square yards:	
ravel, 152 cubic yards, at 60 cents	91.20
tone, 80 cubic yards, at $1.605	128.40
tone, 1,000 cubic yards, at $1.9011	1,901.10
tone, 597.3 cubic yards, at $1.8294	1,092.70
Total material	3,213.40
abor, subsistence, and supervision	1,970.60
	5,184.00
Cost per square yard, $0.928.	
Cubic yards of stone used, per square yard, 0.300+.	
Cost of 1 cubic yard of gravel in place, $1.824.	
Cost of 1 cubic yard of stone in place, $2.971.	
embankments:	
tone, 220 cubic yards, at $1.605	353.10
abor, subsistence, and supervision	305.35
	658.45
Cost of a cubic yard of stone in place, $2.993—.	
ecting mattress No. 44 (241.4 squares):	
trand, $\frac{5}{16}$-inch, 730 pounds, at $4.25 a cwt	31.03
trand, $\frac{1}{4}$-inch, 1,362 pounds, at $5.25 a cwt	71.51
Vire, No. 12, 644 pounds, at $2.495 a cwt	16.07
lips, $\frac{5}{16}$-inch, 150, at $7.09 a hundred	10.64
taples, 40 pounds, at $2.59 a cwt	1.04
rush, 360.8 cords, at $1.26 a cord	454.60
oles, 40.2 cords, at $2 a cord	80.40
tone, 235.5 cubic yards, at $1.9306 a cubic yard	454.66
Total material	1,119.95
teamboat expenses	264.66
abor, subsistence, and supervision	791.94
	2,176.55
Cost per square, $9.016.	
Cords of brush and poles used per square, 1.662—.	
Cubic yards of stone used per square, 0.975+.	
Cubic yards of stone used per cord of brush and poles, 0.587+.	
ıattress at station 52 E. (62.5 squares):	
Vire, No. 12, 184 pounds, at $2.495 a cwt	4.59
rush, 70 cords, at $1.26 a cord	88.20
Total material	92.79
teamboat expenses	46.20
abor, subsistence, and supervision	145.70
	284.69
Total field cost of minor repairs	8,892.60

Cost of extensive repairs.

Grading, 930 linear feet, equaling 3,940 cubic yards:	
Coal	$62.50
Oils, waste, and sundries	7.88
Total material	70.38
Labor, subsistence, and supervision	216.24
	286.62
Cost per linear foot, $0.308+.	
Cost per cubic yard, $0.073—.	
Paving, 9,837.2 square yards:	
Gravel, 539 cubic yards, at 60 cents	323.40
Stone, 2,058.3 cubic yards, at $1.9306	3,973.75
Stone, 892.7 cubic yards, at $1.8294	1,633.10
Total material	5,930.25
Labor, subsistence, and supervision	3,609.43
	9,539.68
Cost per square yard, $0.969+.	
Cubic yards of stone used per square yard, 0.300—.	
Cost of 1 cubic yard of gravel in place, $1.824.	
Cost of 1 cubic yard of stone in place, $3.008.	
Channel mattress No. 13 (961 linear feet, equaling 2,440.9 squares):	
Strand, ½-inch, 5,430 pounds, at $5.25 a cwt	285.08
Strand, ⅜-inch, 87 pounds, at $3.75 a cwt	3.26
Strand, 5/16-inch, 5,465 pounds, at $4.25 a cwt	232.26
Strand, ¼-inch, 12,756 pounds, at $5.25 a cwt	669.69
Wire, No. 12, 6,335 pounds, at $2.495 a cwt	158.06
Wire, Silison bronze, 790 pounds, at $29.39 a cwt	232.18
Staples, 415 pounds, at $2.59 a cwt	10.75
Clips, ½-inch, 541, at $8.20 a hundred	44.36
Clips, ⅜-inch, 135, at $7.14 a hundred	9.64
Clips, 5/16-inch, 1,631, at $7.09 a hundred	115.64
Brush, 3,433.6 cords, at $1.26	4,326.34
Poles, 135.5 cords, at $2	271.00
Stone, 1,453.3 cubic yards, at $1.9306	2,805.74
Total material	9,164.00
Steamboat expense	2,355.61
Labor, subsistence, and supervision	9,336.07
	20,855.68
Cost per linear foot, $21.710+.	
Cost per square, $8.547—.	
Cords of brush and poles used per linear foot of mattress, 3.714—.	
Cords of brush and poles used per square of mattress, 1.462+.	
Cubic yards of stone used per linear foot of mattress, 1.512+.	
Cubic yards of stone used per square of mattress, 0.595+.	
Cubic yards of stone used per cord of brush and poles, 0.407+.	
Connecting mattresses Nos. 41, 42, and 43 (1,591.4 squares):	
Strand, ⅜-inch, 964 pounds, at $3.75 a cwt	36.15
Strand, 5/16-inch, 4,013 pounds, at $4.25 a cwt	170.55
Strand, ¼-inch, 6,295 pounds, at $5.25 a cwt	330.49
Wire, No. 12, 3,467 pounds, at $2.495 a cwt	86.50
Staples, 375 pounds, at $2.59 a cwt	9.71
Clips, ½-inch, 10, at $8.20 a hundred	.82
Clips, ⅜-inch, 22, at $7.14 a hundred	1.57
Clips, 5/16-inch, 647, at $7.09 a hundred	45.87
Brush, 2,326.8 cords, at $1.26	2,931.76
Poles, 81.1 cords, at $2	162.20
Stone, 1,366 cubic yards, at $1.9306	2,637.20
Total material	6,412.82

onnecting mattresses Nos. 41, 42, and 43 (1,591.4 squares)—Continued.

Steamboat expenses	$1,589.21
Labor, subsistence, and supervision	5,048.19
	13,050.22

Cost per square, $8.200+.
Brush and poles used per square of mattress, 1.513+ cords.
Stone used per square of mattress, 0.858+ cubic yards.
Stone used per cord of brush and poles, 0.567+ cubic yards.

tone lost in transit:

Spalls, 235.5 cubic yards	247.50
Stone, 366 cubic yards	424.19
	671.69
Total field cost of "extensive repairs"	44,403.89

'otal field cost of "minor repairs"	8,892.60
'otal field cost of "extensive repairs"	44,403.89
'ffice expenses	378.88
urveys	570.24
epair to plant	6,755.36
are of plant	268.36
epreciation of plant	5,444.81
Total	66,714.14

'otal unit costs:
Grading (average of all), per cubic yard, $0.12—.
Paving (average of all), per square yard, $1.19+.
Connecting mattress (average of all), per square, $10.40+.
Channel mattress, per linear foot, $27.17+.
Channel mattress, per square, $10.70—.

Wolf River (230 L.).—(For references to previous history, see page 154, Report of hief of Engineers, 1905, Supplement.) Special appropriation. No allotment was ade for this work this year and this year's operations were confined to dredging the ar at the mouth of the river, and were limited to the expenditure of the balance availble from last season's operations. Two dump scows, the dipper dredge *Wolf* and the ired steamboat *Satellite* were used on this work during the month of October, 1907. he work done consisted in excavating 14,080 cubic yards of mud and silt and remov-g 2 logs. The cost of the work was as follows:

oal	$371.75
ils, wastes, sundries	82.46
ire of steamer *Satellite* as dredge tender	300.00
abor	1,494.32
Total field expense	2,248.53
ffice expense	184.12
epair of plant	301.12
are of plant	80.00
epreciation of plant	800.00
Total cost	3,613.77

Cost per yard of material excavated, $0.257—.
There are no funds available for this river, and recommendation has been made that anything be done during the coming year that it consist merely in dredging the bar the mouth of the river, and that this be done by one of the hydraulic dredges in arge of the secretary of the Mississippi River Commission. The dredging can be ne much more cheaply by this method than by means of a dipper dredge.

Commercial statistics of Wolf River.

Number of lumber-manufacturing plants	5
Capital invested	$2,042,000
Value of finished products	$2,381,000
Amount paid in wages	$432,730
Timber sawed, feet B. M	59,600,000
Value in logs at mills	$682,800
Towing plants employed:	
Steamboats (7), value	$67,000
Derrick boats (4), value	$18,000
Barges (19), value	$41,000
Freight cars transferred by the Rock Island Railroad Company's steamer *General Pierson*	4,694

The Rock Island Railroad Company has built a new incline, and is not now using the one in Wolf River.

Memphis Harbor, Tenn. (230-232 L.).—(For references to description and previous history and present conditions, see the general summary for this report and p. 155 Report of Chief of Engineers, 1905, Supplement.) See map No. 7 herewith.

Porter Lake, Ark. (261 R.).—The caving bank in this locality has been under special observation for the last few years and the annual surveys show this caving to be at a rate of about 100 feet a year, and indications are that the levee is in no immediate danger. Map No. 8, showing present conditions, is forwarded herewith.

Walnut Bend, Ark. (281 R.).—(For reference to previous history and works, see general summary for this report and Report of Chief of Engineers, 1907, Part 3, p. 2680.) For map showing the general conditions here and the work done this year, see map No. 9 herewith.

This bank has been caving rapidly for several years, and for the purpose of arresting this caving two abattis dikes were built on the tail of the bar above the bend in 1906. From the time of the building of these dikes to the low-water period of 1907 the head of the caving moved from range 11½ downstream to range 13. Below this latter range the caving was active whenever the river was above 6 feet on Mhoons gauge, the caving being high up in the bend for the lower stages and far down in the bend for the higher stages. The caving that threatened the levee most was opposite the levee from station 130 to station 158, and as this was beyond the influence of the abattis dikes, it was necessary to revet the bank in this immediate vicinity in order to save the levee. Plant for mattress work was sent to this locality November 5, 1907. Because of the caving referred to above it was necessary to moor the quarterboats and all other plant not actually in use for construction purposes at Christine Landing, 1½ miles above the site of the revetment work. Between Christine Landing and the work there is an old river bed which made it necessary to keep an extra steamboat in commission for the purpose of transporting the employees to and from the work. The season's work ended February 23, 1908, at which time the bank was under water. During this period work was done as follows:

Channel mattress No. 1 (254 feet by 890 feet, equaling 2,260 squares) built. It was sunk December 20, 1907; Mhoons gauge 6½ feet, current 6.2 feet a second, river rising. The head of this mattress is opposite station 130 of the base line for the local survey.

Connecting mattress No. 1 (59 feet by 220 feet, equaling 129.8 squares). This mattress was sunk December 27, 1907; Mhoons gauge 16 feet, river rising. This mattress is at the head of channel mattress No. 1 and it, like connecting mattresses Nos. 2, 3, and 4, was built to protect the bank along this channel mattress against erosion during the rising river then existing, the rate of this rise being too rapid to permit of paving the bank.

Connecting mattress No. 2 (45 feet by 264 feet, equaling 118.8 squares) was completed and sunk December 30, 1907; Mhoons gage 17½ feet, river rising. The upstream edge of this mattress is 25 feet downstream from the downstream edge of connecting mattress No. 1. The portion of the bank thus left unprotected was protected at a later date during a low stage of river by a brush or bank mattress built directly on the ground.

Connecting mattress No. 3 (89 feet by 240 feet, equaling 213.6 squares) was completed and sunk January 3, 1908. Its upstream edge laps the downstream edge of connecting mattress No. 2.

Connecting mattress No. 4 (100 feet by 193 feet, equaling 193 squares) was completed and sunk January 8, 1908; Mhoons gauge 22½ feet, river falling. The upstream edge of this mattress is in contact with the downstream edge of connecting mattress No. 3. Its downstream edge is about 50 feet below the lower end of channel mattress No. 1.

Channel mattress No. 2 (254 feet by 1,010 feet, equaling 2,565.4 squares) was completed and sunk February 6, 1908; Mhoons gauge 9¾ feet, current 6.8 feet a second, river falling. The upper end of this mattress is opposite station 138; the lower end opposite station 148.

Connecting mattress No. 5 (105 feet by 280 feet, equaling 294 squares), in the pocket directly at the head of channel mattress No. 2, was completed and sunk February 15, 1908; Mhoons gauge 25½ feet, river rising. The upstream edge of this mattress is opposite station 140, and it overlaps a portion of connecting mattress No. 4 and a portion of channel mattress No. 2. Its inner edge is within 2 to 5 feet of the top of the bank all around the pocket.

Connecting mattress No. 6 (126.6 feet by 390 feet, equaling 493.8 squares) is in the pocket which begins 210 feet downstream from the head of channel mattress No. 2. It was sunk February 22, 1908; Mhoons gauge 32½ feet, river rising, at which time the bank surrounding the pocket was from 1 foot to 5 feet under water.

Bank grading and paving.—Seven hundred and fo ty linear feet of bank, beginning at the head of channel mattress No. 1 and extending downstream to the upper end of connecting mattress No. 4, was graded above the inner edges of the mattress work and paved with standard paving (spalls and riprap) to the top of the bank. In this work 6,535 cubic yards of earth were moved and 4,683 square yards of paving laid.

Caving bank greatly interfered with the mattress construction. During the time channel mattress No. 1 was building (November 21–December 20) the bank line at the head of the mattress receded 200 feet. This made it necessary to shift all mooring cables four times, and as "dead men" had to be used for fastenings, the work was costly. During the construction of connecting mattresses Nos. 1, 2, 3, and 4 the bank at the lower end of channel mattress No. 1 receded 195 feet. The greatest recession in the bank line while the mattress party was at Walnut Bend was between stations 138 and 144. Here the total recession was 280 feet. The most rapid caving noted was at station 142 on January 9, 1908, where the caving amounted to 133 feet in less than two hours. This locality is now protected by channel mattress No. 2 and connecting mattresses Nos. 5 and 6. No abutment clumps were used in connection with building the channel mattresses. One was built for channel mattress No. 1, but it was destroyed by caving bank just at the time everything was in readiness for swinging the mooring barges in position. Channel mattress No. 2 was swung in position January 14, 1908, with the mooring barges and mattress head abutting against the bank on connecting mattress No. 4. On the morning of January 18 this mattress was undermined by eddy from below, and it settled about 24 feet. This settlement and caving allowed the mooring barges and attached mattress to swing "inshore" 50 feet, making a shift of all mooring cables necessary. Because five of these cables were "fouled" under edges of mattresses previously sunk, they had to be taken off of the mattress entirely and replaced. After this caving of January 18 there was no further interruption of mattress building through caving bank until January 30, when a slide in the bank opposite station 146 (800 feet below head of channel mattress No. 2) caught the mattress and broke a hole in it about 30 by 50 feet. This sliding bank extended from opposite station 144 (400 feet above foot of channel mattress No. 2) to opposite station 151 (300 feet below foot of channel mattress No. 2). It continued to slide a little at a time until channel mattress No. 2 was sunk, February 6, 1908, but did no further damage.

The results of the work in this locality this season are: Seven hundred and forty linear feet of bank protected with channel mattress, connecting matresses and bank paving to the top of the bank; 700 linear feet of bank protected by channel mattress and connecting mattresses extending nearly to top of bank, excepting a space of 20 to 25 feet between connecting mattress numbers 5 and 6 (station 140) where there is no protection above the inner edge of the channel mattress, and 360 linear feet of bank protected by channel mattress, the inner edge of which lies on the bank at about 9-foot stage on Mhoons gauge. To fully carry out the scheme of protecting the levee by revetment 2,000 feet more of revetment are needed in addition to completing that already begun. As a possible chance of avoiding the building of this additional 2,000 feet the experiment of trying to draw the river away from the critical locality is to be made by means of opening a channel through the bar under Bordeaux Point. There is now a secondary medium-stage channel going through this bar, and it may be that if this channel is enlarged that the main flow of the river will follow this enlargement. If it does so, the current will not strike the Arkansas shore until about 1 mile below the locality where the levee is now endangered. This experiment is to be made by operating on falling stages two or three of the Mississippi River Commission's largest hydraulic dredges simultaneously, the intention being to open the largest possible channel in the shortest possible time, so as to have it fully opened before the river has made a definite low-water channel through the crossing from Bordeaux Point to the head of Walnut Bend. If the experiment is a success, it is probable that further revetment will not be needed.

The cost of this season's operations are as follows:

Grading bank (740 linear feet, equaling 6,535 cubic yards):

Coal	$109.59
Oils, waste, and sundries	16.45
Labor, subsistence, and supervision	503.40
	629.44

Cost per linear foot, $0.851—.
Cost per cubic yard, $0.096+.

Paving (4,683 square yards):

Spalls, 600.7 cubic yards, at $1.9808	1,189.87
Stone, 488.3 cubic yards, at $2.25	1,098.67
Stone, 708.4 cubic yards, at $2.0096	1,426.60
Miscellaneous material	12.90
Total materials	3,725.04
Labor, subsistence, and supervision	1,596.58
	5,321.62

Cost per square yard, $1.136—.
Spalls used per square yard, 0.128 cubic yards.
Stone used per square yard, 0.256 cubic yards.

Channel mattress No. 1 (890 linear feet, equaling 2,260.6 squares):

Strand, ½-inch, 14,864 pounds, at $5.39 a cwt	801.17
Strand, ½-inch, 441 pounds, at $5.25 a cwt	23.15
Strand, 5/16-inch, 5,703 pounds, at $4.25 a cwt	242.38
Strand, ¼-inch, 12,174 pounds, at $5.25 a cwt	639.40
Wire, No. 12, 6,012 pounds, at $2.495 a cwt	150.00
Wire, silicon bronze, 518 pounds, at $29.39 a cwt	152.24
Staples, 380 pounds, at $2.59 a cwt	9.84
Clips, ½-inch, 204, at $8.30 a hundred	16.93
Clips, ½-inch, 887, at $8.20 a hundred	72.73
Clips, ⅜-inch, 100, at $7.14 a hundred	7.14
Clips, 5/16-inch, 1,088, at $7.09 a hundred	77.14
Brush, 3,816.9 cords, at $1.26	4,809.29
Poles, 84.1 cords, at $2	168.20
Spalls, 253.9 cubic yards, at $1.9808	502.93
Stone, 1,320.8 cubic yards, at $2.1008	2,774.74
Miscellaneous material	161.51
	10,608.79
Steamboat expense	2,925.75
Labor, subsistence, and supervision	12,494.70
	26,029.24

Cost per linear foot, $29.246+.
Cost per square, $11,514+.
Brush and poles used per linear foot, 4.383+ cords.
Brush and poles used per square, 1.721+ cords.
Stone and spalls used per linear foot, 1.769+ cubic yards.
Stone and spalls used per square, 0.697— cubic yards.
Stone and spalls used per cord of brush and poles, 0.404— cubic yards.

Channel mattress No. 2 (1,010 linear feet equaling 2,565.4 squares):

Strand, ½-inch, 23,746 pounds, at $5.25 a cwt	1,246.67
Strand, 5/16-inch, 5,552 pounds, a t $4.25 a cwt	235.96
Strand, ¼-inch, 15,452 pounds, at $5.25 a cwt	811.23
Wire, No. 12, 6,942 pounds, at $2.495 a cwt	173.20
Wire, silicon bronze, 555 pounds, at $29.39 a cwt	163.11
Staples, 445 pounds, at $2.59 a cwt	11.52
Clips, ½-inch, 1,562, at $8.20 a hundred	128.08
Clips, 5/16-inch, 1,493, at $7.09 a hundred	105.85
Brush, 3,791.9 cords, at $1.26	4,777.79

Channel mattress No. 2 (1,010 linear feet equaling 2,565.4 squares)—Cont'd.

Poles, 172 cords, at $2	$344.00
Stone, 458 cubic yards, at $2.1008	962.17
Stone, 1,076.2 cubic yards, at $1.9146	2,060.49
Miscellaneous material	155.81
	11,175.88
Steamboat expenses	2,972.92
Labor, subsistence, and supervision	11,041.35
	25,190.15

Cost per linear foot, $24.941—.
Cost per square, $9.819—.
Brush and poles used per linear foot, 3.925— cords.
Brush and poles used per square, 1.545+ cords.
Stone used per linear foot, 1.519+ cubic yards.
Stone used per square, 0.598+ cubic yard.
Stone used per cord of brush and poles, 0.387 cubic yard.

Connecting mattresses Nos. 1, 2, 3, and 4 (655.2 squares):

Strand, ½-inch, 315 pounds, at $5.25 a cwt	16.54
Strand, $\frac{5}{16}$-inch, 3,923 pounds, at $4.25 a cwt	166.73
Strand, ¼-inch, 3,728 pounds, at $5.25 a cwt	195.72
Wire, No. 12, 1,993 pounds, at $2.495 a cwt	49.63
Staples, 115 pounds, at $2.59 a cwt	2.98
Clips, ½-inch, 146, at $8.20 a hundred	11.97
Clips, $\frac{5}{16}$-inch, 436, at $7.09 a hundred	30.91
Brush, 773.7 cords, at $1.26	974.86
Poles, 35 cords, at $2	70.00
Stone, 576.7 cubic yards, at $1.9146	1,104.15
Miscellaneous material	58.49
	2,678.38
Steamboat expense	606.52
Labor, subsistence, and supervision	3,221.60
	6,506.50

Cost per square, $9.931—.
Brush and poles used per square, 1.234+ cords.
Stone used per square, 0.880+ cubic yard.
Stone used per cord of brush and poles, 0.713— cubic yard.

Connecting mattresses Nos. 5 and 6 (787.8 squares):

Strand, ½-inch, 981 pounds, at $5.25 a cwt	51.50
Strand, $\frac{5}{16}$-inch, 4,150 pounds, at $4.25 a cwt	176.38
Strand, ¼-inch, 5,012 pounds, at $5.25 a cwt	263.13
Wire, No. 12, 1,999 pounds, at $2.495 a cwt	49.88
Staples, 110 pounds, at $2.59 a cwt	2.85
Clips, ½-inch, 79, at $8.20 a hundred	6.48
Clips, $\frac{5}{16}$-inch, 417, at $7.09 a hundred	29.57
Brush, 1,053.6 cords, at $1.26	1,327.54
Poles, 50.3 cords, at $2	100.60
Stone, 640.5 cubic yards, at $1.9146	1,226.30
Stone, 194.2 cubic yards, at $2.25	436.95
Miscellaneous material	54.03
	3,725.21
Steamboat expense	827.92
Labor, subsistence, and supervision	2,949.10
	7,502.23

Cost per square, $9.523—.
Brush and poles used per square, 1.400+ cords.
Stone used per square, 1.059+ cubic yards.
Stone used per cord of brush and poles, 0.756+ cubic yard.

Bank mattress:	
Brush, 20 cords, at $1.26	$25.20
Labor, subsistence, and supervision	34.79
	59.99
Value of stone lost in transit:	
Stone, 95.25 cubic yards	100.00
Total cost of field work	71,339.17
Total field cost	71,339.17
Office expenses	1,501.50
Surveys	959.07
Repair to plant	9,166.96
Depreciation	7,388.95
Care of plant	365.58
Total cost	90,721.23

Total unit costs:

Grading, per cubic yard, $0.12+.
Paving, per square yard, $1.44+.
Channel mattress (average for two) per linear foot, $34.29.
Channel mattress (average for two) per square, $13.49+.
Connecting mattress (average for six) per square, $12.35—.

Value of material on hand at close of season:	
Stone on bank at Walnut Bend, 284.6 cubic yards, at $2.388	679.56
Stone on barges at Memphis Fleet, 1,200 cubic yards, at $1.696	2,035.20
Coal	400.00
Strand, clips, wire, etc	7,405.20
Total	10,519.96

Value of the stone includes unpaid freights.

Helena, Ark. (*306 R*).—(For references to previous history and for last map see the general summary for this report and Report of Chief of Engineers, 1905, Supplement, page 155.)

Old Town Bend, Ark. (*324 R*).—(For reference to previous history and works see the general summary for this report and Report of Chief of Engineers, 1907, page 2681. Map No. 10, forwarded herewith shows present conditions.) This bend has been slowly caving for a number of years The bank had receded to such an extent as to threaten the integrity of the levee. In March, 1906, a survey was made to determine the feasibility and cost of building a new levee around the threatened point sufficiently remote from the river to insure a length of life for the new levee of from 15 to 20 years. The survey showed the cost of such a loop to be almost prohibitive; therefore, other measures had to be adopted to preserve the continuity of the levee system. It was thought that by constructing some abatis dikes from the sand bar above the point of attack that the bar would extend downstream sufficiently to cause the river to move its point of attack farther downstream to a point where the levee is more remote from the river and the topographical features of the country are more favorable for building a levee loop, and in 1906 two of these dikes were built. (See Annual Report for 1907, page 2681.) The point of maximum caving was so remote from those dikes as to be beyond their influence and the caving continued with unabated activity, making it necessary to resort to some method that would give immediate protection to the levee. Therefore, instead of building additional dikes, as originally planned, it was decided to revet the bank at the most critical point, the revetment to begin at about station 94, the head of the caving, and extend downstream 5,000 feet.

The necessary plant for this work left Memphis August 20, 1907, and reached Old Town during the afternoon of the 21st, when active operations were at once begun. The location of the head of channel mattress No. 1 is at station 115+20 and not at the upper end of the caving. The reason for this is to cover that stretch of bank nearest the levee, so that in event the work was interrupted by high water or other causes before completion, the levee would be safe for another season. This mattress is 254 feet wide and 1,020 feet long. It was completed and sunk October 6, 1907, Helena gauge 13.5 feet, current 4 feet a second, river falling. The rather unusual length of time it took to make this mattress was due to the inability of the brush contractor

to keep the party in brush. Channel mattress No. 2 was built next. Its head is at station 94+15, which is at the head of the caving. It was intended to make this mattress about 2,000 feet long so as to join channel mattress No. 1, but when 1,601 feet had been made some very heavy rains occurred, interrupting the brush contractor's operations; therefore, it was thought best to cut this mattress off and sink it. This was done November 23, 1907, Helena gauge 16 feet, current 4.5 feet a second, river stationary. The next work done was that of building nine connecting mattresses to make connection between the channel mattresses and the bank, in order that the grading and paving could proceed. Channel mattress No. 3 was commenced on December 21, 1907. This mattress is placed in the gap between channel mattresses Nos. 1 and 2. It is 254 feet wide and 412 feet long. It was completed and sunk January 7, 1908, Helena gauge 25.3 feet. Some time prior to this, decision had been made to try the use of 2-inch by 2-inch strips sawed out of gum, sycamore, and elm as a substitute for willow brush in mattress building. Agreement was entered into with the American Washboard Company to furnish enough of these strips to make a mattress 800 feet long. Work was started on this mattress (channel mattress No. 4) on January 15, 1908. The 2-inch by 2-inch strips, in 12, 14, and 16-foot lengths, were worked in the same manner as willow brush.

It was soon seen that this material was too heavy for mattress construction, for as soon as this mattress was launched off the ways it sunk. When the mattress was only 270 feet long there was such a great strain on the fingers of the weaving barges that the mattress was cut off and sunk on January 28, Helena gauge 23.1 feet, current velocity 8 feet a second, river falling. On January 30, 1907, channel mattress No. 5 was begun, the 2-inch by 2-inch strips being used. The same difficulties were encountered in building this mattress as in building the previous one, and when built to a length of 312 feet it was cut off and sunk on February 11, Helena gauge 21.3 feet, current velocity 8.5 feet a second, river rising. The bank was graded by the usual method, a hydraulic grader being used. In order that all the different kinds of work might be completed at as near the same time as possible, the grader was put to grading the bank along the site for channel mattress No. 2 in advance of the building of that mattress. After about 900 linear feet of bank had been graded the graded bank began to cave so actively that the grading was suspended until channel mattress No. 1 was sunk, after which grading was resumed along the bank protected by that mattress. Paving was begun as soon as a sufficient supply of stone arrived. The rather high cost of the paving is due to the fact that in order to keep ahead of the water and make a good connection between the edge of the mattresses and the shore some of the paving that had been done was moved to other points. This was made necessary by a sudden rise in the river which threatened to cover the bank before additional stone could be procured for use in making the connection referred to. The work was seriously handicapped by the inadequate supply of both brush and stone. The season's work was closed February 22, 1908, and the plant returned to Memphis, Tenn. At the close of the season the following work is in place: 3,615 feet of channel mattress; 14 connecting mattresses aggregating 2,060.1 squares, and 3,200 linear feet of bank paved, aggregating 13,857.7 square yards. The paving is not extended to the top of the bank. Neither is it all carried to the same height, the various heights being regulated by the sand stratum, which was covered so as to afford ample protection until next season. The work yet to be done in this locality consists in grading and paving about 512 feet of bank along mattresses already sunk and in extending the revetment 1,500 feet downstream. The cost of this season's work is as follows:

Channel mattress No. 1—brush (1,020 linear feet, equaling 2.590 squares):

Strand, ½-inch, 13,230 pounds, at $3.25 a cwt	$429.98
Strand, ½-inch, 1,782 pounds, at $5.39 a cwt	96.05
Strand, 5/16-inch, 4,967 pounds, at $4.30 a cwt	213.58
Strand, 5/16-inch, 2,018 pounds, at $4.25 a cwt	85.76
Strand, ¼-inch, 13,220 pounds, at $5.25 a cwt	694.05
Strand, ¼-inch, 1,420 pounds, at $5.33 a cwt	75.69
Clips, ⅝-inch, 14, at $15 a hundred	2.10
Clips, ½-inch, 135, at $8.30 a hundred	11.20
Clips, ½-inch, 1,106, at $9.75 a hundred	107.83
Clips, 5/16-inch, 1,069, at $7.09 a hundred	75.79
Wire, No. 12, 6,809 pounds, at $2.51 a cwt	170.90
Wire, silicon bronze, 1,208 pounds, at $29.39 a cwt	355.03
Wire, silicon bronze, 56 pounds, at $29.25 a cwt	16.38
Brush, 3,584.8 cords, at $1.26	4,516.85
Poles, 143.3 cords, at $2	286.60
Stone, 200 cubic yards, at $2.0609	412.16

Channel mattress No. 1—brush (1,020 linear feet, equaling 2,590 squares)—Continued.

Stone, 1,052 cubic yards, at $2.247	$2,363.84
Staples, 500 pounds, at $2.60 a cwt	13.00
Miscellaneous material	410.53
Total material	10,337.31
Steamboat expense	1,856.94
Labor, subsistence, and supervision	10,797.66
	22,991.91

Cost per linear foot, $22.54+.
Cost per square, $8.88—.
Brush and poles used, per linear foot, 3.65 cords.
Brush and poles used per square, 1.38 cords.
Stone used per linear foot, 1.23 cubic yards.
Stone used per square, 0.48 cubic yard.
Stone used per cord of brush and poles, 0.34 cubic yard.

Channel mattress No. 2—brush (1,601 linear feet, equaling 4,066.5 squares):

Strand, ½-inch, 23,390 pounds, at $5.39 a cwt	1,260.72
Strand, 5/16-inch, 11,158 pounds, at $4.25 a cwt	474.21
Strand, ¼-inch, 23,940 pounds, at $5.33 a cwt	1,276.00
Clips, 5/16-inch, 1,620, at $7.09 a hundred	114.86
Clips, ½-inch, 2,115, at $9.75 a hundred	206.21
Clips, ⅝-inch, 28, at $15 a hundred	4.20
Wire, No. 12, 8,947 pounds, at $2.51 a cwt	224.56
Wire, No. 12, 1,517 pounds, at $2.495 a cwt	37.85
Wire, silicon bronze, 1,773 pounds, at $29.25 a cwt	518.60
Staples, 600 pounds, at $2.60 a cwt	15.60
Brush, 6,041.2 cords, at $1.26	7,611.91
Poles, 214.1 cords, at $2	428.20
Stone, 2,400 cubic yards, at $2.247	5,392.80
Miscellaneous material	405.37
Total material	17,971.09
Steamboat expense	2,462.69
Labor, subsistence, and supervision	14,067.76
	34,501.54

Cost per linear foot, $21.55.
Cost per square, $8.48+.
Brush and poles used per linear foot, 3.9 cords.
Brush and poles used per square, 1.54 cords.
Stone used per linear foot, 1.5 cubic yards.
Stone used per square, 0.59 cubic yard.
Stone used per cord of brush and poles, 0.38 cubic yard.

Channel mattress No. 3—brush (412 linear feet, equaling 1,046.48 squares):

Strand, ½-inch, 3,808 pounds, at $5.39 a cwt	205.31
Strand, 5/16-inch, 2,356 pounds, at $4.25 a cwt	100.13
Strand, ¼-inch, 6,180 pounds, at $5.23 a cwt	329.66
Clips, 5/16-inch, 474, at $7.09 a hundred	33.68
Clips, ½-inch, 489, at $9.75 a hundred	47.19
Clips, ⅝-inch, 19, at $15 a hundred	2.11
Wire, No. 12, 1,968 pounds, at $2.495 a cwt	49.11
Wire, silicon bronze, 352 pounds, at $29.25 a cwt	102.96
Staples, 160 pounds, at $2.60 a cwt	4.16
Brush, 1,352.5 cords, at $1.26	1,704.39
Poles, 20.7 cords, at $2	41.40
Stone, 618 cubic yards, at $2.247	1,388.46
Miscellaneous material	135.93
Total material	4,145.23

ıel mattress No. 3—brush (412 linear feet, equaling 1,046.48 ares)—Continued.

teamboat expense	$658.28
abor, subsistence, and supervision	4,129.08
	8,931.75

Cost per linear foot, $21.72+.
Cost per square, $8.53+.
Brush and poles used per linear foot, 3.33+ cords.
Brush and poles used per square, 1.3 cords.
Stone used per linear foot, 1.48 cubic yards.
Stone used per square, 0.59 cubic yard.
Stone used per cord of brush and poles, 0.45 cubic yard.

ıel mattress No. 4—lumber (270 linear feet, equaling 685.8 ares):

trand, ½-inch, 5,565 pounds, at $5.39 a cwt	299.95
trand, $\frac{5}{16}$-inch, 1,993 pounds, at $4.25 a cwt	84.70
trand, ¼-inch, 4,740 pounds, at $5.33 a cwt	252.64
lips, $\frac{5}{16}$-inch, 370, at $7.09 a hundred	26.23
lips, ½-inch, 396, at $9.75 a hundred	38.52
lips, ⅝-inch, 2, at $15 a hundred	.30
Vire, No. 12, 2,554 pounds, at $2.495 a cwt	63.72
Vire, silicon bronze, 260 pounds, at $29.25 a cwt	76.05
taples, 160 pounds, at $2.60 a cwt	4.16
umber (2 by 2), 226,000 feet B. M., at $13.75 per M	3,107.50
tone, 202 cubic yards, at $2.247	453.89
Iiscellaneous material	107.61
Total material	4,515.27
teamboat expense	401.12
abor, subsistence, and supervision	2,839.56
	7,755.95

Cost per linear foot, $28.72+.
Cost per square, $11.02−.
Lumber used per linear foot of mattress, 837 feet B. M.
Lumber used per square, 330 feet B. M.
Stone used per linear foot, 0.75 cubic yard.
Stone used per square, 0.29 cubic yard.
Stone used per thousand feet B. M., 0.9 cubic yard.

ıel mattress No. 5—lumber (312 linear feet, equaling 792.48 ares):

trand, ½-inch, 4,946 pounds, at $5.39 a cwt	266.58
trand, $\frac{5}{16}$-inch, 2,051 pounds, at $4.25 a cwt	87.16
trand, ¼-inch, 5,100 pounds, at $5.33 a cwt	271.83
lips, $\frac{5}{16}$-inch, 370, at $7.09 a hundred	26.23
lips, ½-inch, 405, at $9.75 a hundred	39.49
lips, ⅝-inch, 6, at $15 a hundred	.90
Vire, No. 12, 3,470 pounds, at $2.495 a cwt	86.57
Vire, silicon bronze, 253 pounds, at $29.25 a cwt	74.00
taples, 160 pounds, at $2.60 a cwt	4.16
tone, 224 cubic yards, at $2.247	502.33
umber (2 by 2), 236,800 feet B. M., at $13.75 per M	3,256.10
Iiscellaneous material	108.80
Total material	4,724.15
teamboat expense	496.90
abor, subsistence, and supervision	2,751.10
	7,972.15

The plant has been decreased by the loss of two material barges, which were wrec[illegible] while towing stone from the Grand Tower quarries, one of these being a new one bu[illegible] in 1907, and the other one of the 1893 barges last rebuilt in 1903.

List and cost of new plant.

Mattress barges *Nos. 0701* and *0703*, cost	$10,240.[illegible]
Material barge *No. 0702*, cost	4,188.0[illegible]
Pile drivers *Nos. 6* and *9*, cost	4,435.0[illegible]
Six skiffs, cost	230.0[illegible]
Barges under construction, cost to date	6,235.7[illegible]
Inspection of contract barges	58.6[illegible]
Tools, appliances, outfits, etc., cost	18,860.8[illegible]
Total	44,248.8[illegible]

Description and cost of repairs to plant.

Steamer *Minnetonka*.—(New wheel built, two new pitmans, three new rudders, new feed pump, new branch pipes, repairs to engines, capstans, wheel, cabin, roof, deck, and furnaces)	$3,724.1[illegible]
Steamer *Chisca*.—(Taken out on the ways at Mound City and hull extensively repaired, new pitmans put in, new wheel built, repairs to machinery, breeching, cabin, roof, boilers, and furnaces)	11,642.1[illegible]
Steamer *Titan*.—(Taken out on the ways at Mound City and thoroughly repaired, received new engine and dynamo, new sheet in boiler, new piston head in one engine, both main cylinders bored out, condensed water supply pipes changed from under boiler deck to under main deck to prevent heating the water, new water-cooling tank put in, headlight repaired, roof patched and painted, rudders repaired, deck repaired and calked, machinery overhauled, furnaces rebuilt, and boat painted outside)	5,617.[illegible]
Steamer *Graham*.—(New wheel built, new working beam for "doctor" made, head and forward deck repaired, machinery, capstan, and furnaces repaired)	825.[illegible]
Steamer *W. M. Rees* (formerly the *H. L. Abbot*).—(Wheel repaired, timber for new pitmans bought but not yet worked out, machinery and furnace repaired, and boat painted)	386.[illegible]
Steamer *Itasca*.—(Furnace rebuilt, new fire door liners, new splash bulkhead, new worm and wheel for capstan, machinery repaired, wheel repaired, cabin repaired and painted)	335.[illegible]
Hydraulic grader *No. 2*.—(Hull patched and calked while afloat, deck patched and calked and machine put into condition for work, new hose purchased)	588.[illegible]
Hydraulic grader *No. 9313*.—(Hull and deck repaired and calked while afloat, pile driver leads repaired, and machinery put into working condition)	686.[illegible]
Pile driver *No. 6*.—(Hull and deck patched and calked and machinery put into working condition)	207.
Pile driver *No. 9*.—(Hoisting engine taken off and transferred to the levee machine and a smaller one on hand put on, new roof covering put on roof, hull and deck repaired and calked, and machinery overhauled)	299.
Dredge *Wolf*.—(Machinery overhauled and repaired, boom repaired, hull calked; lumber for the building of a new boom has been purchased and is now on hand at the fleet)	301.
Derrick boat.—(A new steel boom was built under contract and erected, new hoisting cable for boom and main hoist was rove, new skip built and the old one repaired, machinery overhauled, hull calked, etc.)	619.
Machine-shop boat.—(Shafting lined up, deck patched and calked, machine tools repaired, and one new bolt cutter purchased and set up)	640.
Mooring barges *Nos. 9406* and *9409*.—(Both were docked and repaired and calked)	826.
Mooring barges *Nos. 1* and *2*.—(Both of these barges were docked and rebuilt)	5,873.
Mattress barges *Nos. 5, 6, 9308*, and *9312*.—(Patched and calked while afloat, ways and stanchions repaired or renewed, and platforms extended outboard 6 feet, so as to give a platform width of 11 feet. All reels carrying the bottom wire strands were taken out of the holds and set up on deck so as to facilitate the mounting of the full reels)	2,593.[illegible]

naterial barges.—(These were docked and calked and received to rakes, bottoms, and decks, and new timber heads put where)	$5,702.70
naterial barges.—(These were calked and patched while afloat eir decks and timber heads repaired or renewed)	4,122.80
barge *No. 9303*.—(This barge was thoroughly rebuilt on the	3,096.50
ıp scows.—(These were calked and patched and made ready ice)	185.10
arter boats.—(These received repairs to hulls, cabins, and roofs, re calked while afloat)	2,304.31
oat *No. 27*.—(The cabin of this boat was remodeled, new roof put ked, and hull repaired afloat)	2,056.10
dock.—(Hull, gates, valves, and floor were repaired at various	441.42
d flats.—(These were all put into serviceable condition, their lecks, and bottoms being calked and repaired)	448.77
l appliances.—(Repairs were made to ranges, stoves, wheelbarrows, nd appliances for construction parties, shop, fleet, and office use,	3,431.71
tal repairs to plant	56,957.67
ıt	44,248.84
lant	15,781.07
tal	116,987.58

ment of cost of plant and depreciation during the year ending April 30, 1908.

Name.	Number.	Original cost.	Valuation last year.	Repairs during year.	Depreciation.	Present value.
ıdel	2	$7,500.00	$3,389.50	$742.84	$1,250.00	$2,882.34
ked	2	6,200.00	1,398.67	3,312.27	1,033.33	3,677.61
ked	6	19,020.00	8,628.92	3,031.79	3,170.00	8,490.71
ked	5	14,000.00	9,018.97	2,132.75	2,333.33	8,818.39
ked	2	6,340.00	3,438.23	783.31	1,056.67	3,164.87
ked	3	9,300.00	5,476.30	1,502.99	1,550.00	5,429.29
ked	1	3,100.00	1,825.43	250.00	2,075.43	Sunk.
ked	2	6,740.00	5,716.42	672.28	1,123.33	5,265.37
ked	1	3,170.00	2,853.00	493.77	528.33	2,818.44
ked	1	4,188.05	.....	.....	4,188.05	Sunk.
ıttress	2	9,060.00	3,373.04	1,312.20	1,510.00	3,175.24
ıttress	2	10,240.00	.....	.....	.....	10,240.00
ıttress	2	5,600.00	4,403.70	1,281.60	933.33	4,751.97
ıoring	2	4,046.00	2,955.67	5,873.50	674.33	8,164.84
ıoring	2	7,500.00	4,428.30	826.56	1,250.00	4,004.86
.....	1	450.00	205.00	72.00	75.00	202.00
.....	1	410.00	231.67	86.00	68.33	249.34
.....	1	496.00	247.33	92.00	82.67	256.66
.....	1	460.50	383.84	88.00	76.75	395.09
ɔlf	1	8,000.00	4,593.50	301.12	800.00	4,094.62
at No. 3	1	2,956.00	2,886.99	619.11	295.60	3,210.50
ıp	2	6,572.00	3,909.73	185.10	657.20	3,437.63
ırter	3	10,935.00	3,729.76	644.23	1,093.50	3,280.49
ırter	2	7,290.00	7,282.96	276.30	729.00	6,830.26
ter, No. 27	1	2,788.00	1,665.80	2,056.10	278.80	3,443.10
ter, No. 29	1	2,741.00	1,628.35	146.10	274.10	1,500.35
ırter	2	9,800.00	7,781.80	1,057.88	980.00	7,859.68
ter	1	3,059.00	2,874.27	179.80	305.90	2,748.17
grader	1	30,232.00	2,678.20	588.64	666.84	2,600.00
grader	1	3,823.00	3,749.45	686.60	382.30	4,053.75
ock	1	9,475.00	8,156.80	441.42	947.50	7,650.72
ıop boat	1	8,501.00	4,179.84	640.83	850.10	3,970.57
finnetonka	1	40,000.00	20,000.00	3,724.18	3,200.00	20,524.18
hisca	1	25,900.00	13,090.79	11,642.16	2,072.00	22,660.95
itan	1	23,500.00	15,402.02	5,617.69	1,880.00	19,139.71
raham	1	9,500.00	8,221.52	825.24	760.00	8,286.76
tasca	1	9,500.00	3,162.72	335.75	570.00	2,928.47
. M. Rees	1	5,330.00	3,689.35	386.56	426.40	3,649.51
nique	1	14,000.00	10,827.00	.....	840.00	9,987.00
s	2	4,435.00	.....	506.52	443.50	4,598.02
appliances	.....	49,668.43	45,156.47	3,431.71	4,966.84	43,621.34
.....	22	400.00	481.83	110.77	66.67	525.93
l	.....	.....	.....	56,957.67	46,465.13	.....

PART II.—LEVEE WORK.

Upper St. Francis levee district (Cape Girardeau, Mo., to 70 R.).—(For references to previous history see Report of Chief of Engineers, 1905, Supplement, p. 156, and 1907, volume 3, p. 2685. See map No. 11 herewith.) The Mississippi County levee board, in addition to providing the necessary right of way for the season's work, has done some levee work, as shown in a subsequent statement. The St. John levee board No. 1, having failed in their bond issue, has accomplished nothing in the way of levee construction.

At the beginning of this season there was only one contract in force, and work on it had not been begun. The time limit for completion was January 1, 1908. The details concerning this contract are set forth in the following table:

Location.	Miles below Cairo.	Cubic yards.	Price per cubic yard.	Remarks.
			Cents.	
26/20 to 28/26	30 R.	307,206	19.7	Completed Jan. 10, 1908.

On June 1, 1907, bids were opened and contracts were subsequently made for work in this district, to be completed December 31, 1908, and paid for out of the allotment of $115,000 from the appropriation of March 2, 1907, as shown in detail in the following table:

Location.	Miles below Cairo.	Estimated.	Price per cubic yard.	Contractor.	Kind of work.	Remarks.
		Cub. yds.	*Cents.*			
8/3+20 to 8/8	10 R.	12,000	21.7	W. L. Mosby	New levee	Not begun.
10/15 to 13/20	13 R.	162,000	21.7	do	New levee and enlargement.	15 per cent completed.
18/35 to 21/40	20 R.	210,600	17	R. L. Leonard	do	54 per cent completed.
21/40 to 25/14	24 R.	190,000	17	do	do	65 per cent completed.
26/15 + 30 to 26/20	30 R.	10,400	22	Wood Bros.	New levee [a]	Completed Oct. 19, 1907.
Total		585,000				

[a] This contract was let on ten-day proposals opened Aug. 10, 1907, to replace about 470 linear feet of levee which was washed away at the end of the system during the 1907 high water.

These contracts included 10 acres of grubbing at $175, 4 acres at $150, and 1½ acres at $100 per acre.

The Mississippi County levee board completed the work which was under contract at the beginning of the season, which was given in the last annual report as containing 227,000 cubic yards, with 20,000 cubic yards in place, by the addition of 220,128 cubic yards, making a total in this contract of 240,128 cubic yards.

In addition to the above, this board undertook the following work during the season:

Location.	Miles below Cairo.	Estimated.	Kind of work.	Remarks.
		Cub. yds.		
30/22 to 30/44	(a)	21,000	Enlargement	Not commenced.
30/44 to 31/39	(a)	100,807	do	94 per cent completed.
16/2+20 to 16/15+20	17	7,202	New levee	Completed.
Total		129,009		

[a] Above.

The locations of the first and second pieces in the above table are given in miles below Commerce, Mo. All other places mentioned in the report for this district are given in miles below Birds Point, Mo. In all future reports reference will be given in miles, measured along the levee line, beginning with 0 at Commerce, Mo., and carried continuously throughout the district. This extension adds about 32 miles of levee line to the district, exclusive of the 2¾ miles necessary to levee across the lowlands from the Cape Girardeau bluffs to Grays Point, known as the Rock levee road.

Summary of earth in place.

Authority.	In place Apr. 30, 1907.	Added during year.	Abandoned for new loops.	In place Apr. 30, 1908.	Under contract Apr. 30, 1908.
	Cub. yds.	*Cub. yds.*	*Cub. yds.*	*Cub. yds.*	*Cub. yds.*
ted States	826,992	591,644	59,000	1,359,636	359,250
ee boards	511,419	343,137	29,000 a 4,000	821,556	26,000
Total	1,338,411	934,781	92,000	2,181,192	385,250

a Loss due to the erosion at the end of the levee from 26/15 to 26/20.

The $45,000 allotted at the June meeting of the Commission for the purpose of con-
ıcting a levee across the low land just below Cape Girardeau has not as yet been
ɔended. A project for this work was submitted and approved for the construction
ı levee along the Rock levee road a distance of 2 miles and 39 stations and containing
ɔut 200,000 cubic yards. This work was advertised in October, but the interested
ee boards failed to secure the right of way and the advertisement was withdrawn
l no bids received. A proposition was then made by Mr. Lewis Houck, who was
ıstructing a railroad diagonally across the low land in front of the proposed levee
ation, to combine the levee and railroad construction, and by raising the grade and
reasing the section of his proposed road to make it answer for both levee and railroad.
is proposition looked favorable at first, but upon a more thorough investigation it
s found that it would not be serving the best interests of the Government, and the
a was abandoned.
The matter of condemning the necessary right of way along the Rock levee road in
ordance with the original project has been in the hands of the United States district
orney for some time, and it is hoped to get this work under contract in the near future.

BENCH MARKS AND MILEPOSTS.

Stone and cedar posts have been prepared and will be placed to mark the end of each
le, beginning at Commerce, Mo., throughout the district. The stones which are to
used for bench marks are of a good quality of limestone, 4 by 6 inches by 4½ feet,
ssed to a smooth surface on top, and bearing on the top surface the number of the
es to which it belongs. These stones will be set on the land-side slope of the levee,
ctically flush with the surface, and connected in elevation with the Commission's
ch marks. These points will also be marked with the cedar posts, 6 by 6 inches by 6
, set 2½ feet in the ground. The lower 2½ feet has been treated with coal tar. The
er 3½ feet was dressed down to 5 by 5 inches, pointed at the top and painted with
e coats of white lead and linseed oil. These posts also bear the mile numbers.
here are no points of serious caving in this district.
ap No. 11 shows the profile of the present levee, with the elevations of several
ortant high waters plotted thereon, and a key map to the district.
eelfoot levee district (36–60 L.).—(For references to previous history, see Report of
ef of Engineers for 1905, Supplement, p. 157. See map No. 12 herewith.) At the
inning of this season three contracts were in force in this district for closing the
ile gap between the Kentucky and the Tennessee levees. The time for the com-
ion of these contracts was January 1, 1908. The details of this work are shown in
following table:

Location.	Miles below Cairo.	Actual cubic yards.	Price per cubic yard.	Contractor.	Remarks.
			Cents.		
to 13/0	48 L.	186,593	15	Bondurant & Wilson	Completed Oct. 25, 1907.
to 15/0	52 L.	180,564	17½	R. T. Tyler	Completed Jan. 30, 1908.
to 16/32	56 L.	142,628	18⅞	do	Completed Jan. 7, 1908.

he completion of these contracts closes the Reelfoot district in accordance with
original plans, and gives a continuous line of levee from Hickman, Ky., to the
h ground at Slough Landing, Tennessee, a distance of 21 miles. It is very probable,
vever, that the closing of this district and the completion of the upper St. Francis
se line will materially raise the flood plane in the vicinity of New Madrid, Mo.

No new contracts were made by the United States during the season. No work was done by the local levee boards.

There is no caving of any consequence in this district.

A line of stone bench marks, as described for the upper St. Francis district, has been set in this district, and a party is now in the field connecting them with the Mississippi River Commission bench marks.

Map No. 12 shows the profile of the present levee, with the elevations of several important high waters platted thereon, and a key map to this district.

Lower St. Francis levee district (*79–298 R.*).—(For references to previous history, see Report of Chief of Engineers for 1905, Supplement, p. 157. See maps Nos. 13 and 14 herewith.)

At the beginning of the season two contracts were in force, to be completed by January 1, 1908, the details of which are shown in the following table:

Location.	Miles below Cairo.	Actual cubic yards.	Price per cubic yard.	Contractor.	Remarks.
			Cents.		
112/0 to 123/0	198 R.	403,676	16½	Roach & Stansell	Completed Jan. 22, 1908.
171/0 to 174/0	251 R.	180,492	16⅔	do	Completed Dec. 27, 1907.
Total		584,168			

On June 1, 1907, bids were opened and contracts were subsequently made for work in this district to be completed December 31, 1908, and paid for out of the allotment of $225,000 from appropriation of March 2, 1907, as shown in detail in the following table:

Location.	Miles below Cairo.	Estimated.	Price per cubic yard.	Contractor.	Remarks.
		Cub. yds.	*Cents.*		
Portage Bayou	74 R	6,095	19.5	P. H. Rogers	Completed Oct. 15, 1907.
1 mile above Point Pleasant.	78 R	22,500	17.74	do	11 per cent completed.
1/40 to 8/0	81 R	286,500	17.74	do	31 per cent completed.
17/0 to 24/0	97 R	258,500	17.7	A. C. Tindle	34 per cent completed.
36/0 to 40/0	119 R	175,000	16.74	R. L. Leonard	70 per cent completed.
104/0 to 108/0	191 R	198,000	22.7	Roach & Stansell.	22 per cent completed.
110/40 to 112/0	197 R	35,000	22.7	do	Completed Oct. 31, 1907.
Total		981,595			

The above contracts included 6 acres of grubbing, at $200; $7\frac{8}{10}$ acres, at $100, and 7 acres, at $90 per acre.

On June 27 bids were opened for the purpose of reletting the unfinished portion of the work covered by the contracts (which were annulled as stated in the last annual report) to enlarge 139/15 to 139/37, 140/0 to 141/0, 144/32 to 145/52, and 147/41 to 148/0. The only bid received was that of P. H. Rogers, at 37 cents per cubic yard on each piece. This bid was rejected, and an arrangement was made by and with the original bondsmen, T. E. Jones and H. T. Bruce, under which contracts were made and the work done at the original contract price, as shown in the following table:

Location.	Miles below Cairo.	Actual.	Price per cubic yard.	Contractor.	Remarks.
		Cub. yds.	*Cents.*		
139/22 to 139/37	218 R.	17,071	16	Jones & Bruce	Completed Dec. 19, 1907.
140/36 to 140/46	218 R.	19,703	21	P. H. Rogers	Completed Nov. 30, 1907.
145/27 to 145/52	224 R.	38,136	21	do	Completed Oct. 31, 1907.
147/41 to 148/0	226 R.	13,174	16	Jones & Bruce	Completed Dec. 6, 1907.
Total		88,084			

etails of work undertaken by the St. Francis levee board of Arkansas during on are shown in the following table:

tion.	Miles below Cairo.	Cubic yards.	Price per cubic yard.	Contractor.	Remarks.
			Cents.		
:o 48/0...	129 R.	115,798	18	R. L. Leonard.....	Completed.
0.....	131 R.				
35.....	147 R.	700,000	24	Canal Construction Co.	Not begun.
.....	222 R.	11,952	27	P. H. Rogers.....	Completed.
7/0.....	255 R.	117,310	17	.....do.....	Do.
1/0.....	260 R.	154,953	18.94	R. L. Cheshire.....	62 per cent completed.
.....	281 R.	25,725	25	P. H. Rogers.....	Completed.
l.....	.....	1,125,738	.....		

a Spur levee. b New loop.

llowing table shows the present status of work let by this board prior to and ed at the date of the last annual report:

ation.	Miles below Cairo.	Cubic yards.	Price per cubic yard.	Contractor.	Remarks.
			Cents.		
:o 57/0.....	140 R.	62,179	20	R. L. Leonard.....	Completed.
1/0.....	171 R.	240,300	17	.....do.....	80 per cent completed.
0.....	179 R.	174,474	16.5	.....do.....	Completed.
9/15.....	215 R.	172,000	18	.....do.....	72 per cent completed.
.47/8.....	225 R.	20,000	20	.....do.....	15 per cent completed.
1/0.....	250 R.	373,000	20.87	Lowrance Bros.....	95 per cent completed.
1/0.....	265 R.	453,000	16.5	P. H. Rogers.....	Completed.
al.....	.....	1,504,953	.....		

llowing is a summary of work done by the St. Francis levee board of Missouri he past fiscal year:

Location.	Miles below Cairo.	Estimated.	Price per cubic yard.	Remarks.
		Cub. yds.		
22.....	108 R.	65,000	$0.29	12.5 per cent completed.
/50.....	110 R.	10,000	.12½	Completed.
/25.....	111 R.	8,000	1.00	Do.
al.....	.....	83,000	.....	

st-mentioned piece was the roadbed of the Frisco Railway through the town hersville, Mo.

cutting.—The weeds were cut on 88 miles of levee in the lower St. Francis at a total cost of $793.12.

machine.—The levee machine which was constructed at the Government d which at the writing of the last annual report was engaged in cutting a ditch river bank to the levee on mile 155 (240 R.), has, since the completion of the een operated on the enlargement of the levee from 154/50 to 155/26+80 (240 R.); ubic yards of enlargement were put up and 8,718 cubic yards wasted from the tch. The construction and operation of this machine was largely experimental. nsequence, many delays were occasioned in the early part of the season by f individual parts that were not strong enough to carry the varying strains and o which they were subjected. As these failing parts were replaced by stronger s, the efficiency of the machine was raised until the work done in January ruary was very satisfactory, being 12,601 cubic yards, at a total cost of $1,999.58, cents per cubic yard. The operation of this machine has demonstrated the t a steel machine of a similar design can be successfully operated, and it is

believed will in the future take a prominent part in the construction of levees where the ordinary process with wheel scrapers is too expensive and the locality is such that the narrow, deep pit resulting from the use of the machine will not endanger the levee by subsequent scouring during overflows.

Summary of earth in place.

Authority.	In place Apr. 30, 1907.	Added during year.	In place Apr. 30, 1908.	Under contract Apr. 30, 1908.
	Cub. yds.	*Cub. yds.*	*Cub. yds.*	*Cub. yds.*
United States	8,457,202	921,483	9,378,685	572,500
Levee boards	11,974,335	1,075,780	13,050,115	1,092,875
Total	20,431,537	1,997,268	22,428,800	1,665,375

No levee has been lost in this district due to caving during the past year, although about 600 feet of levee, containing about 18,000 cubic yards, was abandoned on account of the nearness of the caving bank, mile 206/43 (283 R.). There is more or less caving that threatens the levee at the following places: Point Pleasant, Mo., 78 R.; Linda, Mo., 85 R.; Gayoso, Mo., 106 R.; Caruthersville, Mo., 110 R.; Cottonwood, Mo., 124 R.; Osceola, Ark., 164 R.; Golden Lake, Ark., 190 R.; St. Clair, Ark.; 221 R.; Pattons, Ark., 240 R.; Porter Lake, Ark., 260 R.; and Walnut Bend, Ark., 281 R.

At the last-named place the levee would have been breached before now if the caving had not been checked by the bank revetment placed there during the past season. These points are all under observation and the necessary surveys will be made from time to time to determine the progress of the caving and the necessity of protective action.

Stone bench marks and cedar mileposts similar to those described for the Upper St. Francis district have been provided and will be set from mile 150 to mile 208, which will complete this scheme in this district.

Maps Nos. 13 and 14, herewith, show the profile of the present levee with the elevations of several important high waters plotted thereon, and a key map to this district.

Upper Yazoo levee district (244–365 L.).—(For references to previous history, see Report of Chief for Engineers for 1905, Supplement, p. 158. See map No. 15 herewith.) The levees in this district are in such excellent condition and the local levee board is so well equipped to take care of them that no allotments for new work were made during the past year. One incomplete contract, which was let on August 31, 1905, is still in force, the details of which are shown in the following table:

Location.	Miles below Cairo.	Cubic yards.	Price per cubic yard.	Contractor.	Remarks.
			Cents.		
75/36 to 79/0	320 L	113,765	24.95	Roach & Stansell	90 per cent completed.

The borrow pits along this work are the natural receptacle for the drainage of a considerable area in their vicinity, and drainage for them is not practicable within a reasonable cost.

The contractor moved back on this work in June and worked a good, substantial force until in February, when he was compelled to stop on account of rain and seep water in pits. This work will be completed during the coming summer.

Summary of earth in place.

Authority.	In place Apr. 30, 1907.	Added during year.	In place Apr. 30. 1908.	Under contract Apr. 30, 1908.
	Cub. yds.	*Cub. yds.*	*Cub. yds.*	*Cub. yds.*
United States	7,416,521	65,906	7,482,427	13,255
Levee board	19,701,632	1,176,681	20,878,313	1,194,287
Total	27,118,153	1,242,587	28,360,740	1,207,542

g was lost by caving bank, and no levee was abandoned during the year.
o. 15 shows the profile of the present levee, with the elevation of several t high waters plotted thereon, and a key map of the district.
River levee district (306–383 R.).—(For references to previous history, see f Chief of Engineers, 1905, Supplement, p. 159. See map No. 16 herewith.)
ginning of last season the following contracts were in force, the first to be paid f the allotment of $70,000 for 1904–5 and the second from the allotment of or 1906–7:

tion.	Miles below Cairo.	Cubic yards.	Price per cubic yard.	Contractor.	Remarks.
			Cents.		
0.....	344 R	169,986	17.4	W. F. Barbour & Son.	Completed Jan. 30, 1908.
.....	310 R	254,251	21	Roach & Stansell.....	Completed Jan. 16, 1908.
l.....	.....	424,237	.....		

st contract included 4 acres of grubbing, at $200 per acre.
ie 1, 1907, bids were opened on work in this district as follows:

tion.	Miles below Cairo.	Estimated cubic yards.	Price per cubic yard.	Name of bidder.	Remarks.
			Cents.		
.....	320 R	140,000	.....	.....	No bid.
.....	321 R	75,000	.....	.....	Do.
.....	324 R	130,000	.....	.....	Do.
.....	326 R	200,000	.....	.....	Do.
.....	328 R	150,000	.....	.....	Do.
0.....	375 R	225,000	21.9	Roach & Stansell.....	Bid too high; rejected.
l.....	.....	920,000	.....		

ere again opened on this work July 5 with very similar results, only one ie piece being received. This bid was 20.24 cents on the last piece, made ance Brothers, of Huffman, Ark., and was also rejected because the bid and the bidder could not cover the work until the spring of 1908.
his work had been twice advertised without receiving satisfactory bids, a effort was made to get some of it under contract by inviting bidders, by otice and otherwise, to submit bids on the various pieces, which resulted , as shown in the following table:

ion.	Miles below Cairo.	Estimated cubic yards.	Price per cubic yard.	Contractor.	Remarks.
			Cents.		
.....	320 R.	140,000	22	Roach & Stansell.....	Let Dec. 14, 1907; 7 per cent completed.
2.....	325 R.	67,700	21	.....do.....	Let Dec. 19, 1907; 14 per cent completed.
14.....	325 R.	78,234	18.75	W. A. Bickford.....	Let Sept. 13, 1907; completed Feb. 8, 1908.
evee....	348 R.	24,579	22	Roach & Stansell.....	Let Dec. 14, 1907; completed Feb. 8, 1908.
0.....	375 R.	157,000	18.9	Lowrance Bros.....	Let Jan. 23, 1908; 5 per cent completed.
l.....	.....	467,513	.....		

st, second, and fifth pieces are to be completed by December 31, 1908. The ce was a small loop to cover the breach made in the levee by grading and the bank at Old Town. The fourth piece was a spur levee 1,200 feet in length, ed to protect the main levee from the erosive current at high water when the ut of its bank. The river at this stage rushes across a narrow neck of land in he levee and on several occasions has nearly breached the main levee during

On June 27, 1907, bids were received on the unfinished portions of the six annulled contracts of the Talley-Bates Construction Company. All the bids were excessively high and were rejected. A subsequent arrangement between the original bondsmen and these bidders was made whereby the latter agreed to do the work at the original contract prices, and contracts were made as shown in the following table:

Location.	Miles below Cairo.	Cubic yards.	Price per cubic yard.	Contractor.	Remarks.
			Cents.		
26/11 to 28/4	335 R.	52,986	15	H. F. Watkins	Completed Feb. 21, 1908.
28/47 to 29/16	336 R.	30,315	19	do	Do.
29/47 to 30/13	337 R.	16,589	19	Wm. Bates	Completed Oct. 22, 1907.
32/2 to 32/53	339 R.	49,310	19	Jack O'Grady	Completed Jan. 21, 1908.
34/26 to 34/37	342 R.	9,025	16	do	Completed Feb. 21, 1908.
63/28 to 63/35 63/43 to 64/45	385 R.	59,350	14.74	do	67 per cent completed.
Total		217,575			

The time for the completion of the above contracts was January 1, 1908.

H. F. Watkins put a force of 30 teams on his work September 16. This force was not sufficient to complete the work within the contract time, and, being unable to increase his force, an outfit of 30 teams was hired by the day by the United States and put on this work November 4. About December 1 Mr. Watkins declared his inability to continue the work, due to the fact that he could no longer get credit to provide the necessary feed and other supplies. The contract was therefore annulled on December 9, under prior authority of the Chief of Engineers, and finished with a hired force. The contractor for the last three pieces began work in September and had practically enough teams to have completed his work on time under favorable circumstances, but being unable to keep his outfit supplied with labor, combined with unfavorable weather conditions in December and January, caused the work to run considerably over the time limit. He at all times expressed a determination to complete the work, and as there was no reason to doubt his ability to do so, no forces were added by the United States. The lower piece was discontinued on account of high water, but the force is camped in the vicinity waiting to complete the work as soon as the water gets off.

The Cotton Belt levee board has made no new contracts during the season. The status of the work which was put under contract last year is shown in the following table:

Location.	Miles below Cairo.	Cubic yards.	Price per cubic yard.	Remarks.
			Cents.	
4/7 to 4/52	310 R.	32,843	24.95	Completed Sept. 2, 1907.
9/0 to 9/47	216 R.	75,000	19	68 per cent completed.
Total		107,843		

The Laconia levee board has undertaken very little work, as shown in the following table:

Location.	Miles below Cairo.	Cubic yards.	Price per cubic yard.	Remarks.
			Cents.	
68/29 to 68/39+50	385 R.	1,230	20	Completed, banquette.
69/0 to 69/37	385 R.	4,921	20	11 per cent completed, banquette.
70/45 to 71/24	385 R.	5,338	20	9 per cent completed, banquette.
70/43 to 71/11+40	385 R.	4,332	20	Not begun.
Total		15,821		

Summary of earth in place.

Authority.	In place Apr. 30, 1907.	Added during year.	In place Apr. 30, 1908.	Under contract Apr. 30, 1908.
	Cubic yds.	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*
ed States	8,141,464	557,476	8,698,940	357,000
e boards	1,845,580	65,183	1,910,763	37,336
Total	9,987,044	622,659	10,609,703	395,136

he amount of levee abandoned during the season on account of caving banks was it 2,400 linear feet, at Old Town, Ark., containing about 28,500 cubic yards.

ap No. 16 shows the profile of the present levee with the elevations of several ortant high waters plotted thereon, and a key map to the district.

aving bank.—The only caving bank in this district which may be expected to anger the levee interests in the next two or three years is in the vicinity of Fergu- Ark. (364 R.). The caving has been very active during the past low-water season, there is still about 500 feet from the shore to the levee.

tone bench marks.—Stone bench marks similar to those described for the Upper St. ncis levee district have been set throughout this district. Level parties are now he field connecting these stones with the M. R. C. bench marks. Duplicate levels run with ordinary Wye levels and New York rods. A maximum limit of difference wed between the two levels is 0.025 of a foot to each mile in distance run.

teel levee machine.—A contract dated February 28, 1908, was made with the Brown- Engineering Company, of Cleveland, Ohio, to furnish, erect, and successfully rate a steel levee machine for a period of two weeks, for the sum of $14,710. The tract time for the delivery is May 10, 1908. The design is that of a revolving crane is similar in principle to the old wooden machine now in use. It is designed to y 5½ tons working load on a 100-foot boom and is guaranteed to handle 100 cubic ds per hour. A bonus of $100 per cubic yard will be paid for each yard in excess .00 cubic yards handled per hour, and a penalty of $100 per cubic yard will be ucted for each yard less than 100 cubic yards.

'ences.—Three and one-half miles of wire fences, 4 wires, posts 12 feet apart, were structed at an average cost of $143 per mile. These fences were constructed paral- with the line of levee for the purpose of removing the cross fences, which are not y a hindrance to the proper inspection and maintenance, but are in many instances actual menace to the interests of the levee system. The intention was that the ited States should build one-half of the necessary fencing and the adjoining property ner the other half. Upon investigating conditions thoroughly it was found that re existed in the Upper St. Francis district about 50 cross fences, in the Reelfoot rict about 35, in the Lower St. Francis about 200, and in the White River about 6, ting a total of something like 291 cross fences in the four districts. The Upper oo district is clear of fences. The building of one-half of the fencing necessary to all these cross fences off the levee would entail a very considerable expense. This, pled with the probability that this plan was inviting an endless source of trouble petty annoyances in connection with all future maintenance, brought about a eral sifting of the matter for a better and more effective means of handling the ation.

fter consulting the United States district attorney, it was decided that inasmuch ll occupancy of the Government levees by private parties was in direct violation of ions 14, 16, and 17 of the river and harbor act of March 3, 1899, found on pages 2 and 1153 of volume 30, Statutes at Large, there was no reason why the United es should bear the expense of constructing or maintaining any part of the par- l fences necessary to remove the cross fences, and that this expense should be ne by the parties directly interested. Therefore the former idea of Government struction of fences was abandoned, and all parties in the several districts having es on or across, or otherwise occupying the levees, were notified by letter from office that all such fences must be removed and all occupancy discontinued by tember 1, 1908, or criminal proceedings would be instituted against them in the ted States courts. No serious opposition to this scheme is anticipated. When it ccomplished the levees will be entirely fenced out. This will enable stock run- g at large to graze over them, which will, by keeping the weeds down, improve the dition of the sod and practically eliminate the annual expense of weed cutting.

HIGH-WATER OPERATIONS.

Four moderately high waters passed out of the Ohio River during the last three months, each passing the flood stage at Cairo, Memphis, and Helena, as shown by the following dates and gauge readings:

	Cairo gauge.[a]		Memphis gauge.[b]		Helena gauge.[c]	
	Date.	Reading.	Date.	Reading.	Date.	Reading.
First rise	Feb. 26,1908	44.90	Mar. 3,1908	35.15	Mar. 6,1908	44.10
Second rise	Mar. 19,1908	45.55	Mar. 23,1908	35.65	Mar. 26,1908	45.20
Third rise	Apr. 13,1908	45.32	Apr. 20,1908	35.15	Apr. 23,1908	44.56
Fourth rise	May 20,1908	45.10	May 25,1908	35.30	May 27,1908	44.40

[a] Flood stage, 45. [b] Flood stage, 33. [c] Flood stage, 43.

No high-water work has been necessary except to protect the lower end of the levee in the Upper St. Francis district, and the outer end of the new spur levee at Avenue, Ark. The first piece was taken care of by the Mississippi County levee board, the United States furnishing them 3,000 sacks; the second piece was done by the United States, and consisted of revetting the end of the spur with sacks of earth, at a cost of about $415 for labor and $250 for sacks.

The following table shows the amounts expended by the United States in the various levee districts for the year ending April 30, 1908:

District.	Total expended.	Construction.	Engineering and local inspection.	Maintenance.	High water.	Surveys.	Office.	General inspection.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Upper St. Francis	$114,679.95	95.1	3.2	0.1	.....	0.3	0.9	0.4
Reelfoot	74,827.98	95.8	3.2	.3	.....	.....	.5	.2
Lower St. Francis	177,349.88	92.4	4.9	.8	0.1	.....	1.3	.5
Levee machine	17,803.08	.....	.....	.....	.....	.....	.....	.....
Upper Yazoo	16,413.67	91.8	7.3	.....	.....	.....	.....	.9
White River	123,474.13	92.3	4.5	.2	.6	.....	1.9	.5
Total	524,548.69							

Five per cent of the care, repair, and depreciation of plant is chargeable to levees, and this is prorated to each district according to the total mileage of existing levees, as shown in the following table:

District.	Length of district.	Length of levee built.	Care of plant.	Repair of plant.	Depreciation of plant.
	Miles.	*Miles.*			
Upper St. Francis	90	47.5	$79.50	$286.91	$231.25
Reelfoot	21	21	35.14	126.85	102.24
Lower St. Francis	212	202.5	338.97	1,223.12	985.84
Upper Yazoo	124	124	207.57	748.98	603.67
White River	74	74	123.87	446.97	360.26
Total	521	469	785.05	2,832.83	2,283.26

SURVEYS.

The usual low-water surveys of revetted banks, caving banks, etc., were made during the year. Several levee surveys were found necessary in order to complete the office records and to give information required for current work. The river survey party was organized July 19, 1907, and made the various annual surveys as follows:

Slough Landing Neck, Kentucky and Tennessee (60 L.).—This locality has been under observation for five years, and the rate of caving on the lower side has been practically uniform. The caving on the upper side, reported last year as decreasing, was greater during the past season than in any previous year, as shown on the accompanying map. The shortest distance between caving banks in 1902 was 10,500 feet and the

shortest distance in 1907 was 8,000 feet, a total approach of 2,500 feet in five years, or a rate of 500 feet per year, at which rate it will take about sixteen years to effect a junction. The total rate of caving in the bight of the bend on the upper side of the neck has been 360 feet per year and the rate in the lower bend has been 480 feet per year, indicating a total recession of the top bank of 840 feet per year. The bights of the two bends are 10,000 feet apart longitudinally and have been approaching each other longitudinally at the rate of 600 feet per year. At this rate it will take seventeen years to consume the intervening space; therefore the rate of approach of the two bends can be based on the shortest distance between them. This gives fifteen years as the life of the neck. The total caving, however, on the line of shortest distance between the bends was 1,000 feet during the past season, a continuation of which rate will reduce the life of the neck to eight years.

New Madrid, Mo. (70 R.).—The cross sections plotted from the survey over the revetment show no change except on range 18, where an average scour of 6 feet is shown on the slope. The zero line of the upper end of the middle bar has moved downstream about 1,000 feet. The map of Slough Landing Neck shows the location of this work and the middle bar.

Caruthersville, Mo. (110 R.).—The annual survey over the revetment shows no change in the cross sections. The caving below the revetment is still active, and the bank above the revetment, which has been stable for years, shows light caving. No map of this survey is submitted.

Plum Point reach (147 to 168 miles below Cairo).—The chute of Island 26, Daniels Point, Ark., Ashport Bend, Tenn., Gold Dust Chute (including Elmot Chute and chute of Island 30), Osceola bars, Ark., Fletchers Bend, Ark., and Bullerton bar, Ark., are parts of Plum Point reach, and the surveys at these points, if properly connected, would produce a survey of the reach as a whole. Such connection work was only partially done, yet sufficient data was obtained to enable a map to be submitted covering the important changes.

The caving in the bend above Island 26 includes the head of the chute of Island 26 and the head of the island itself. This bank change permits a more direct action of the current through the chute, and the chute is consequently gradually enlarging. The increased volume of water through the chute of Island 26 forces the current to the head of the tow-head of Ashport bar, resulting in the gradual disappearance of the towhead and the enlargement of the chute behind the tow-head of Ashport bar. Gold Dust Chute has enlarged throughout its entire length and the current through this chute is attacking the bank just above Osceola. The distance by channel from the head of the chute of Island 26 to the caving at Osceola is 19 miles and between the same points through the chutes is 15½ miles. A map of this reach, in three parts, is submitted herewith.

Chute of Island 26 (150 L.).—A map of this survey is Plate I of the Plum Point reach maps, and shows the caving and enlarged cross section of the chute.

Daniels Point, Ark. (152 R.).—The survey over the revetment shows practically no change except a slight recession of the top bank at the unprotected points at the lower end. Plate I of the Plum Point reach maps shows the location of the work.

Chute of tow-head of Ashport bar (155–157 R.).—The result of this survey is shown on Plate II of the Plum Point reach maps, and indicates the decrease in size of the tow-head of Ashport bar and the increase in width of the cross sections in the chute. No cross sections were made in 1904, but from observation the depths are known to have increased.

Ashport Bend (154–157 L.).—The cross sections of this survey over the revetment show no change except on ranges 0 and 2 at the lower end, where an average scour of 10 feet is indicated. This scour has been active for two years and represents the eddy action just below the end of the revetment. The bar at the upper end continues to make downstream and shows a fill on the upper ranges. Plate II, Plum Point reach map, shows the location of this work.

Gold Dust Chute (158–164 L.).—This survey, which includes Elmot Chute and the chute of Island 30, was made to determine the amount of enlargement in the chute due to other changes in Plum Point reach. A comparison of the survey of 1904 and that of 1907 is shown on Plates II and III of the Plum Point reach maps. A decided increase in cross section is noticed on every range, except on those in the chute between Elmot bar and Island 30, where a decrease in cross section is shown.

Fletchers Bend, Ark. (158–161 R.).—The cross sections over the revetment at this point show no change except a scour beyond the edge of the mat on ranges 180 to 186 and on ranges 196 to 204. The bar at the upper end is making downstream and shows a fill on ranges 248 to 254. The location of this work is shown on Plates II and III of the Plum Point reach maps.

Osceola bars, Ark. (165 R.).—(See Plate III of the Plum Point reach maps and map No. 5.) The cross sections on ranges 58 to 87 show the caving as indicated on the map.

Ranges 89 to 106+50 show an average fill of 10 feet on the slopes below low water. The middle bars at this point are disappearing.

Bullerton bar, Ark. (168 R.).—(See Plate III of Plum Point reach maps.) A survey over the lower end of the revetment at Bullerton bar shows no change in the cross sections at the lower end. The bar over the upper part of the work continues to make slowly downstream.

Hopefield Bend (227–230 R.).—(See map No. 6.) The cross sections over the revetment are practically unchanged with the following exceptions: Ranges 86, 88, and 90, just above the pocket that caved in on Hopefield Point in July, 1907, and range 98, just below the pocket, show an average scour of about 15 feet below low water, although the top bank and the slope remain the same; ranges 6 west, 14 west, and 44 west show a tendency to scour. The erosion at these three western ranges will probably stop soon on account of the channel change heretofore mentioned in this report.

Memphis bar and revetment (229–232 L.).—The cross sections in front of the bar show a decided fill in the channel of the river, a scour on the slope, and a corresponding recession of the top bank of the bar. The ranges over the revetment show no changes from previous years. The map accompanying this report shows the recession of the top bank of the bar and the recession of the zero contour of the bar below Hopefield Point.

Patton, Ark. (240 R.).—This survey was made to determine the rate of caving and location of the levee. The local levee board has been advised of the conditions at this point, and it is expected that they will take care of it. No map is submitted.

Porter Lake, Ark. (261 R.).—The base line established at this point last year caved in the river, and the levee was this year made the base of future surveys. While the caving as shown on the map herewith was comparatively light, the conditions seem favorable to active caving. This bank will be watched closely on account of its great importance in connection with the main line of levee.

Walnut Bend, Ark. (280 R.).—A survey was made at this point as soon as the water went down to determine the results obtained from the dikes and the rate of caving in the bend. It was found that the effect of the dikes was not rapid enough to protect the threatened levee, and another survey was made for the information of the construction party that began work here late in the season. A map showing the conditions at this point and the revetment work done is submitted herewith.

Helena, Ark. (307 R.).—The annual survey to determine the condition of the revetment was made and cross sections were plotted, which show no change during the past year.

Old Town Bend, Ark. (325 R.).—The survey of the bar above and the caving bend below Old Town Landing was made just before construction work was started at this place. Conditions similar to those at Walnut Bend prevailed, as shown on the map herewith.

The party returned to Memphis and disbanded October 31. Two inspectors were retained in the office, reducing and plotting notes and assisting in reindexing all the maps in the office. Sixty-eight tracings have been made in the past six months.

The following table shows the cost of the surveys for the season:

Cost of surveys for season (1907–8,) ending April 30, 1908.

	Days.	Services.	Subsistence supplies.	Fuel, oil, waste, etc.	Drafting room.	Transportation.	Totals.
Hopefield Bend					$3.00		$3.00
Do	9	$280.98	$58.98	$42.42	183.33	$1.53	567.24
Walnut Bend					7.67	6.00	13.67
Do	8	249.76	52.42	37.71	162.96	1.36	504.21
Do	7	218.54	45.87	33.00	142.59	1.19	441.19
Helena front	4	124.88	26.21	18.86	81.48	.68	252.11
Old Town	5	156.10	32.77	23.57	101.85	.85	315.14
Porter Lake	6	187.32	39.32	28.28	122.22	1.02	378.16
Patton	3	93.65	19.66	14.15	61.11	.51	189.08
Memphis Harbor	6	187.31	39.32	28.28	122.22	1.02	378.15
Slough Landing	6	187.31	39.32	28.28	122.22	1.02	378.15
New Madrid	4	124.87	26.22	18.86	81.48	.68	252.11
Caruthersville	4	124.87	26.22	18.86	81.48	.68	252.11
Daniels Point	6	187.31	39.32	28.28	122.22	1.02	378.15
Chute of Island 26	7	218.53	45.87	33.00	142.59	1.19	441.18
Ashport Bend	6	187.31	39.32	28.28	122.22	1.02	378.15
Elmot Chute	9	280.97	58.99	42.42	183.33	1.56	567.27
Fletchers Bend	9	280.97	58.98	42.42	183.33	1.55	567.25
Osceola bar	3	93.65	19.66	14.14	61.11	.52	189.08
Bullerton bar	2	62.43	13.12	9.43	40.53	.35	125.86
Total	104	3,246.76	681.57	490.24	2,128.94	23.75	6,571.26

Depths over shoal crossings in first and second districts during the low-water season of the calendar year 1907.

Locality.	Miles below Cairo.	Dates of trips, 1907.								
		Aug. 24.	Sept. 5 to 8.	Sept. 16 to 20.	Sept. 21 to 25.	Oct. 2.	Oct. 17.	Oct. 30 to 31.	Nov. 8 to 14.	Dec. 15 to 16.
Cairo gauge reading	0	20.8	18.9 to 17.8	14.8 to 15.5	15.3 to 13.4	15.3	15.9	10.2 to 9.9	11.3 to 15.2	12.1 to 12.7
New Madrid gauge reading	70	17.0	15.7 to 14.7	12.3 to 12.5	12.5 to 11.2	12.4	13.0	8.7 to 8.4	8.9 to 11.9	9.6 to 9.9
Depths at:										
Nolans Crossing	76	18.0	.....	16.5	.....	.....	.....	.....	.....	.....
Linda Crossing	82	16.0	13.5	.....	.....	.....	.....	.....	13.5	.....
Joe Eckles Crossing	93	.....	12.0	10.5	.....	.....	.....	.....	13.5	.....
Island 14 Crossing	99	.....	18.0	13.5	.....	.....	.....	.....	13.0	.....
Fritz Crossing	101	.....	.....	.....	.....	.....	.....	.....	.....	13.5
Hathaway Crossing	103	18.0	.....	.....	.....	.....	.....	.....	15.0	.....
Cottonwood Point gauge reading	123	15.2	14.0 to 12.8	10.2 to 10.1	10.2 to 9.1	9.8	10.5	6.4 to 6.2	6.1 to 8.8	7.1 to 7.1
Depths at:										
O'Donnell Crossing	150	.....	13.5	.....	.....	.....	.....	.....	.....	13.5
New Haven Crossing	163	.....	.....	.....	13.5	.....	.....	.....	12.0	13.5
Plum Point Crossing	165	.....	.....	.....	13.5	.....	.....	.....	.....	.....
Fulton gauge reading	175	14.2	13.4 to 12.6	10.6 to 10.4	10.5 to 9.8	10.1	10.8	7.6 to 7.4	7.1 to 9.2	8.0 to 8.0
Depths at:										
Island 35 Crossing	187	18.0	.....	.....	.....	.....	.....	.....	.....	12.0
Island 35 Crossing	190	.....	.....	.....	13.5	.....	.....	.....	.....	.....
Carona Crossing	203	12.0	8.0	.....	7.5	.....	12.0	.....	.....	.....
Fogleman Crossing	210	.....	.....	.....	.....	.....	.....	.....	15.5	12.0
Paddy Hen Crossing	223	.....	16.5	.....	16.5	.....	.....	.....	.....	.....
Memphis gauge reading	230	14.8	13.8 to 13.1	11.0 to 10.4	10.6 to 10.1	9.9	11.0	7.5 to 7.3	6.8 to 8.6	7.9
Depths at:										
Foot of Presidents Island Crossing	240	.....	.....	.....	.....	12.0	.....	.....	15.0	13.5
Ensleys Crossing	242	.....	13.0	.....	.....	.....	.....	.....	.....	.....
Armstrongs Crossing	243	.....	.....	.....	10.5	.....	.....	9.0	.....	.....
Horn Lake Crossing	244	.....	.....	.....	.....	12.0	.....	.....	16.5	15.0
Graves Bayou Crossing	246	.....	.....	.....	10.5	10.5	.....	.....	.....	.....
Pinckney Crossing	253	.....	.....	.....	10.5	.....	.....	.....	.....	.....
Depths at:										
Cow Island Towhead Crossing	255	.....	.....	.....	.....	.....	.....	9.0	.....	.....
Polks Crossing	265	.....	.....	.....	.....	12.0	.....	.....	15.0	13.5
McConnells Towhead Crossing	270	.....	.....	.....	.....	.....	.....	.....	.....	15.0
Peters Crossing	271	.....	.....	.....	.....	.....	.....	.....	.....	13.5
Foxburn Crossing	274	.....	.....	.....	13.5	.....	.....	13.5	.....	.....
Mhoons gauge reading	276	14.4	13.5 to 12.6	9.3 to 8.3	8.4 to 8.0	7.7	9.6	5.3 to 4.8	3.8 to 6.1	5.9 to 5.5
Depths at:										
Mhoons Crossing	276	.....	.....	13.5	15.0	12.0	.....	.....	13.5	.....
Hardings Point Crossing	289	.....	.....	.....	13.5	.....	.....	.....	.....	.....
Helena gauge reading	307	18.9	18.0 to 17.4	14.6 to 13.6	13.6 to 13.5	12.4	14.2	10.6 to 10.2	9.0 to 10.8	10.8 to 10.5
Depths at Montezuma Crossing	314	.....	.....	16.0	13.5	13.5	.....	.....	.....	.....

These soundings were made by towboats en route with tows. It is not certain th the boat was in the deepest channel at the time the soundings were made, and it w impracticable to stop for investigation as to whether or not a deeper channel w available.

INCLOSURES.

The following inclosures accompany this report, of which they are parts:
Map No. 1.—Slough Landing Neck and New Madrid, Mo.
Map No. 2.[a]—Chute of Island 26 and Daniels Point, Arkansas.
Map No. 3.[a]—Chute of Towhead of Ashport bar, Ashport Bend, Gold Dust Chu and Fletchers Bend.
Map No. 4.[a]—Gold Dust Chute, Fletchers Bend, Osceola bars and Bullerton ba
Map No. 5.[a]—Osceola bars.
Map No. 6.[a]—Hopefield Bend.
Map No. 7.[a]—Memphis bar and revetment.
Map No. 8.[a]—Porter Lake, Arkansas.
Map No. 9.[a]—Walnut Bend.
Map No. 10.[a]—Old Town Bend.
Map. No. 11.[b]—Upper St. Francis levee district.
Map No. 12.[b]—Reelfoot levee district.
Map No. 13.[b]—Lower St. Francis levee district, sheet 1.
Map No. 14.[b]—Lower St. Francis levee district, sheet 2.
Map No. 15.[b]—Upper Yazoo levee district.
Map No. 16.[b]—White River levee district.
Money statements and abstract of contracts in force will be forwarded July 1.
Respectfully submitted.

WM. D. CONNOR,
Captain, Corps of Engineers.

Col. WM. H. BIXBY,
Corps of Engineers. U. S. Army.
President Mississippi River Commission.

FINANCIAL STATEMENT.

Appropriation for improving Mississippi River, first and second districts.

HICKMAN, KY.

July 1, 1907, balance unexpended	$372.
July 1, 1908, balance unexpended	372.

NEW MADRID, MO.

July 1, 1907, balance unexpended	$2, 520.
July 1, 1908, balance unexpended	2, 520.

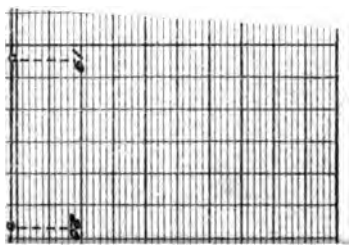
CARUTHERSVILLE, MO.

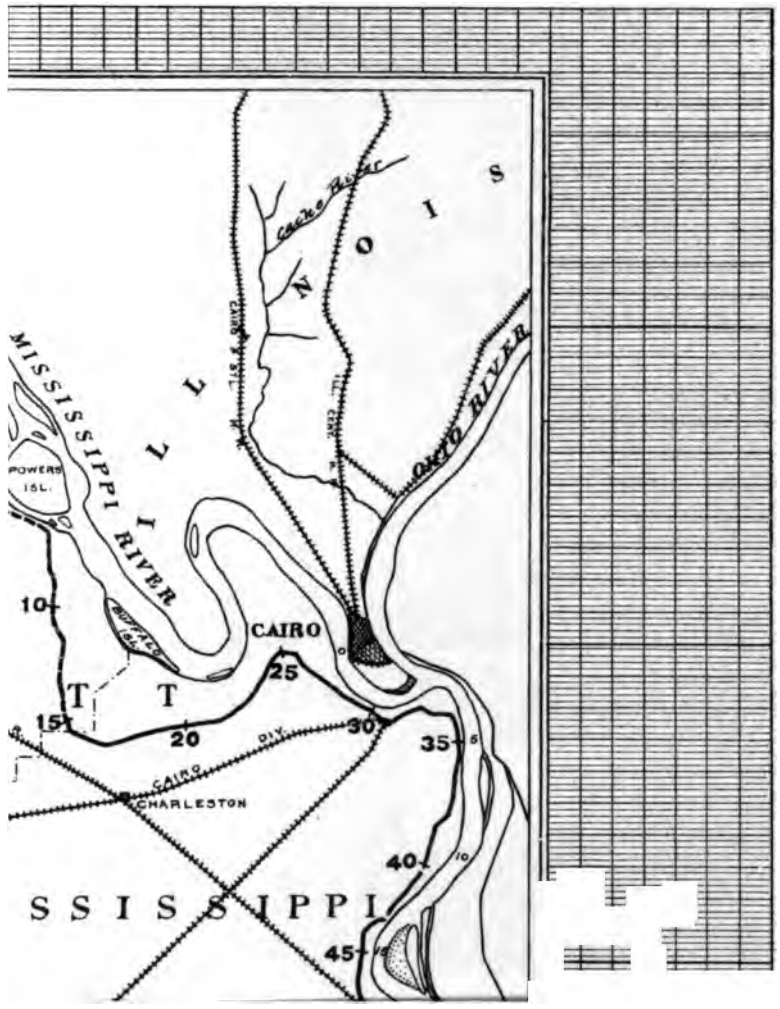
July 1, 1907, balance unexpended		$1, 589.
June 30, 1908, amount expended during fiscal year		70.
July 1, 1908, balance unexpended		1, 519.

PLUM POINT REACH.

July 1, 1907, balance unexpended		$37, 667.
August 23, 1907, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	$543. 95	
July 1, 1908, amount expended during fiscal year	5, 757. 90	
		$6, 301.
July 1, 1908, balance unexpended		31, 366.
July 1, 1908, outstanding liabilities		7, 500.
July 1, 1908, balance available		23, 866.

[a] Not printed. [b] Profiles showing top of levees and high-water slopes.




MISSISSIPPI RIVER
POWERS ISL.
BUFFALO ISL.
CAIRO
CAIRO & ST. L. R.R.
ILL. CENT.
OHIO RIVER
Cache River
ILLINOIS
TENNESSEE
CAIRO
CHARLESTON
DIV.
10
15
20
25
30
35
40
45
SSISSIPPI

CHUTE OF ISLAND 26 (ABATTIS DIKES).

July 25, 1907, amount reallotted from Walnut Bend		$6,000.00
July 25, 1907, amount reallotted from Old Town Bend		12,000.00
		18,000.00
November 5, 1907, amount transferred to allotment for plant	$2,000.00	
April 8, 1908, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	607.48	
June 30, 1908, amount expended during fiscal year	1,350.28	
		3,957.76
July 1, 1908, balance unexpended		14,042.24

HOPEFIELD BEND.

July 1, 1907, balance unexpended		$44,227.17
December 2, 1907, amount received by transfer from allotment for Old Town Bend		12,000.00
April 29, 1908, amount refunded on account of overpayment in vouchers 73, October, and 68, November, 1907		.47
		56,227.64
August 23, 1907, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	$1,087.44	
November 5, 1907, amount transferred to allotment for plant, first and second districts	5,000.00	
March 27, 1908, amount Treasury settlement, being amount paid Chicago, Rock Island and Pacific Railroad for freight on stone	346.43	
April 8, 1908, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	225.26	
June 30, 1908, amount expended during fiscal year	49,448.44	
		56,107.57
July 1, 1908, balance unexpended		120.07
July 1, 1908, outstanding liabilities		50.00
July 1, 1908, balance available		70.07

MEMPHIS, TENN. (WOLF RIVER).

July 1, 1907, balance unexpended		$2,317.65
April 29, 1908, amount refunded on account of overpayment in voucher 68, November, 1907		.30
		2,317.95
June 30, 1908, amount expended during fiscal year		2,317.95

WALNUT BEND.

July 1, 1907, balance unexpended		106,297.53
April 29, 1908, amount refunded on account of overpayment in vouchers 68, November, and 61, December, 1907		.55
		106,298.08
July 25, 1907, amount transferred to allotment for chute of Island 26	$6,000.00	
November 5, 1907, amount transferred to allotment for plant, first and second districts	12,000.00	
November 19, 1907, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	1,819.07	
March 27, 1908, amount Treasury settlement, being amount paid Chicago, Rock Island and Pacific Railroad for freight on stone	403.90	
April 8, 1908, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	1,000.00	

April 23, 1908, amount Treasury settlement, being amount paid Chicago, Rock Island and Pacific Railroad for freight on stone	$156.02	
June 30, 1908, amount expended during fiscal year	78,721.55	
		$100,100.54
July 1, 1908, balance unexpended		6,197.54
July 1, 1908, outstanding liabilities		500.00
July 1, 1908, balance available		5,697.54

HELENA, ARK.

July 1, 1907, balance unexpended		$1,086.33
July 1, 1908, balance unexpended		1,086.33

OLD TOWN BEND.

July 1, 1907, balance unexpended		$177,864.94
April 29, 1908, amount refunded on account of overpayment in vouchers 73, October; 68, November, and 61, December, 1907		.53
		177,865.47
July 25, 1907, amount transferred to allotment for chute of Island 26	$12,000.00	
August 14, 1907, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	2,009.16	
August 23, 1907, amount Treasury settlement, being amount paid Chicago, Rock Island and Pacific Railroad for freight on stone	7.79	
November 15, 1907, amount transferred to allotment for plant, first and second districts	18,000.00	
November 19, 1907, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	1,150.00	
December 2, 1907, amount transferred to allotment for Hopefield Bend	12,000.00	
May 27, 1908, amount Treasury settlement, being amount paid Chicago, Rock Island and Pacific Railroad for freight on stone	34.30	
June 30, 1908, amount expended during fiscal year	131,231.36	
		176,432.61
July 1, 1908, balance unexpended		1,432.86
July 1, 1908, outstanding liabilities		300.00
July 1, 1908, balance available		1,132.86

UPPER ST. FRANCIS LEVEE DISTRICT.

July 1, 1907, balance unexpended		$233,579.70
September 4, 1907, amount refunded on account disallowance by the Auditor, voucher 72, July, 1905		1.92
		233,581.62
November 5, 1907, amount transferred to allotment for plant, first and second districts	$5,000.00	
April 8, 1908, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	200.00	
June 30, 1908, amount expended during fiscal year	122,945.72	
		128,145.72
July 1, 1908, balance unexpended		105,435.90
July 1, 1908, outstanding liabilities		60,435.90
July 1, 1908, balance available		45,000.00

REELFOOT LEVEE DISTRICT.

July 1, 1907, balance unexpended		$63,144.13
September 4, 1907, amount disallowed by the Auditor on voucher 82, July 1905		1.65
June 30, 1908, amount expended during fiscal year		63,145.78

LOWER ST. FRANCIS LEVEE DISTRICT.

June 30, 1907, balance unexpended		$344,131.19
January 10, 1908, amount overpayment in voucher 112, December, 1907		9.13
April 29, 1908, amount overpayment in voucher 73, October, 1907		.10
		344,140.42
November 5, 1907, amount transferred to allotment for plant, first and second districts	$5,000.00	
March 13, 1908, amount Treasury settlement, being amount paid Missouri Pacific Railroad Company, for freight on railroad iron for levee machine	5.78	
April 8, 1908, amount transferred to Capt. G. R. Lukesh, Corps of Engineers, (in payment for coal)	350.00	
May 31, 1908, amount Treasury settlement, being amount paid Southern Railway Company for freight on envelopes	2.76	
June 30, 1908, amount expended during fiscal year	187,384.32	
		192,742.86
July 1, 1908, balance unexpended		151,397.56
July 1, 1908, outstanding liabilities		99,663.39
July 1, 1908, balance available		51,734.17

WHITE RIVER LEVEE DISTRICT.

July 1, 1907, balance unexpended		$267,142.30
November 5, 1907, amount transferred to allotment for plant, first and second districts	$5,000.00	
December 3, 1907, amount transferred to allotment for plant, first and second districts	40,000.00	
April 6, 1908, amount Treasury settlement, being amount paid Chicago, Rock Island and Pacific Railroad for freight on levee outfit	45.60	
April 8, 1908, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	150.00	
June 30, 1908, amount expended during fiscal year	120,476.50	
		165,672.10
July 1, 1908, balance unexpended		101,470.20
July 1, 1908, outstanding liabilities		97,566.96
July 1, 1908, balance available		3,903.24

UPPER YAZOO LEVEE DISTRICT.

July 1, 1907, balance unexpended	$29,854.90
June 30, 1908, amount expended during fiscal year	16,402.92
July 1, 1908, balance unexpended	13,451.98
July 1, 1908, outstanding liabilities	5,755.98
July 1, 1908, balance available	7,696.00

SURVEYS, FIRST AND SECOND DISTRICTS.

July 1, 1907, balance unexpended		$6,617
January 25, 1908, amount received from sale of blueprints		
		6,617
November 19, 1907, amount transferred to Capt. G. R. Lukesh, Corps of Engineer (in payment for coal)	$172.50	
April 8, 1908, amount transferred to Capt. G. R. Lukesh, Corps of Engineers (in payment for coal)	139.00	
June 30, 1908, amount expended during fiscal year	6,289.88	
		6,601
July 1, 1908, balance unexpended		15
July 1, 1908, outstanding liabilities		15

PLANT, FIRST AND SECOND DISTRICTS.

July 1, 1907, balance unexpended		$67,519
September 14, 1907, amount allotted, being proceeds from sale of engineer property, approved by Acting Secretary of War, September 9, 1907		23
October 20, 1907, amount allotted, being proceeds from sale of engineer property, approved by Acting Secretary of War, October 14, 1907		34
November 5, 1907, amount received by transfer from allotment for Old Town Bend		18,000
November 5, 1907, amount received by transfer from allotment for Walnut Bend		12,000
November 5, 1907, amount received by transfer from allotment for Lower St. Francis levee district		5,000
November 5, 1907, amount received by transfer from allotment for Upper St. Francis levee district		5,000
November 5, 1907, amount received by transfer from allotment for White River levee district		5,000
November 5, 1907, amount received by transfer from allotment for Hopefield Bend		5,000
November 5, 1907, amount received by transfer from allotment for chute of Island 26		2,000
December 3, 1907, amount received by transfer from allotment for White River levee district		40,000
February 17, 1908, amount refunded on account of error in voucher 100, September, 1907		
November 5, 1907, amount refunded on account of overpayment in voucher 1, August, 1907		1
April 29, 1908, amount refunded on account of overpayment in voucher 73, October, 1907		
May 18, 1908, amount received from the Pittsburg Coal Company for damages sustained by the U. S. barge *No. 9407*, while in collision with steamer *Fritz*		29
		159,609
August 31, 1907, amount transferred to appropriation for improving Mississippi River from mouth of the Ohio River to Minneapolis, Minn., "between mouths of Ohio and Missouri rivers," in payment of pile drivers	$4,435.00	
February 17, 1908, amount Treasury settlement, in payment for storm and recruiting flags	12.78	
June 30, 1908, amount expended during fiscal year	120,363.37	
		124,811
July 1, 1908, balance unexpended		34,797
July 1, 1908, outstanding liabilities		26,640
July 1, 1908, balance available		8,157

MISCELLANEOUS.

August 29, 1907, amount received from sale of engineer property	$23.25
September 30, 1907, amount received from sale of engineer property	34.50
September 9, 1907, amount received from the Chicago, Rock Island and Pacific Railroad Company for rent of Government pile driver	595.00
January 25, 1908, amount received for 2 blueprints	.25
February 21, 1908, amount received from B. F. Dame for rent of island in the Mississippi River near Australia, Miss., for year ending February 24, 1909	1.00
April 28, 1908, amount received from the Pittsburg Coal Company in compromise of the claim of the United States for damages sustained by the U. S. barge *No. 9407*, in collision with the steamer *Fritz*	29.81
	683.81

August 29, 1907, amount deposited to credit Treasurer United States on account sale of engineer property	23.25
September 9, 1907, amount deposited to credit Treasurer United States on account rent of Government pile driver	595.00
September 30, 1907, amount deposited to credit Treasurer United States on account sale of engineer property	34.50
January 25, 1908, amount deposited to credit Treasurer United States on account sale of blueprints	.25
February 21, 1908, amount deposited to credit Treasurer United States on account rent of island in Mississippi River, near Australia, Miss., for year ending February 24, 1909	1.00
April 28, 1908, amount deposited to credit Treasurer United States on account compromise of claim for damages against the Pittsburg Coal Company	29.81
	683.81

Abstract of contracts in force June 30, 1908, improving Mississippi River, first and second districts.

Name of contractors.	Amount and character of work.	Rate.	Date of approval.	Date of beginning work.	Date of expiration of contract.
G. W Fisher	Rent of river front at Memphis, Tenn	$50 per year	Lease	Apr. 1, 1908	Mar. 31, 1909
Chas. H. Boyle	do	$50 per year	do	do	Do.
	Upper St. Francis levee district.				
W. L. Mosby	12,000 cubic yards levee work, station 8/3+20 to station 8/9	21.7 cents per cubic yard	June 27, 1907	Sept. 1, 1907	Dec. 31, 1908
	½ acre grubbing	$175 per acre			
	162,000 cubic yards levee work, station 10/15 to station 13/20	21.7 cents per cubic yard			
	2 acres grubbing	$150 per acre			
	9½ acres grubbing	$175 per acre			
R. L. Leonard	400,000 cubic yards levee work, stations 18/35 to 21/40 and 21/40 to 25/14	17 cents per cubic yard	do	July 1, 1907	Do.
	2 acres grubbing	$150 per acre			
	1½ acres grubbing	$100 per acre			
	Lower St. Francis levee district.				
P. H. Rogers	9,500 cubic yards levee work at Portage Bayou	19½ cents per cubic yard	do	Sept. 1, 1907	Do.
	1.3 acres grubbing at Portage Bayou	$100 per acre			
	22,500 cubic yards levee work 1 mile above Point Pleasant, Mo	17.74 cents per cubic yard			
	2 acres grubbing 1 mile above Point Pleasant, Mo	$100 per acre			
	286,500 cubic yards levee work, station 1/40 to 8/0	17.74 cents per cubic yard			
	1½ acres grubbing	$100 per acre			
A. C. Tindle	258,500 cubic yards levee work, station 17/0 to station 24/0	17.7 cents per cubic yard	do	Aug. 1, 1907	Do.
	7 acres grubbing	$90 per acre			
R. L. Leonard	175,000 cubic yards levee work, station 36/0 to station 40/0	16.74 cents per cubic yard	do	July 1, 1907	Do.
	2½ acres grubbing	$100 per acre			
Roach & Stausell	233,000 cubic yards levee work, stations 104/0 to 108/0 and 110/4 to 112/0	22.7 cents per cubic yard	do	Sept. 1, 1907	Do.
	White River levee district.				
Jack O'Grady	34,200 cubic yards levee work, station 32/0 to station 32/53	19 cents per cubic yard	Aug. 1, 1907	do	[a]Jan. 1, 1908
	9,700 cubic yards levee work, station 34/26 to station 34/37	16 cents per cubic yard			
	54,800 cubic yards levee work, stations 63/28 to 63/35 and 63/43 to 64/45	14.74 cents per cubic yard			
Roach & Stansell	140,000 cubic yards levee work, station 13/8 to 15/0	22 cents per cubic yard	Emergency contract.	Feb. 1, 1908	Dec. 31, 1908
Lowrance Brothers	70,000 cubic yards levee work, station 19/0 to 19/42	21 cents per cubic yard	do	Mar. 1, 1908	Do.
	4 acres grubbing	$100 per acre			
	157,000 cubic yards levee work, station 56/40 to 60/0	18.9 cents per cubic yard	Feb. 6, 1908	do	Jan. 1, 1909
	4½ acres grubbing	$40 per acre			

Duvic & Johnston	5 wooden barges	[illegible]	[illegible]	[illegible]	[illegible]
Zeb. Ward	10,000 tons riprap stone	75 cents per ton	[illegible]	[illegible]	[illegible]

* Time limit waived.

APPENDIX 3.

REPORT OF CAPT. CLARKE S. SMITH, CORPS OF ENGINEERS, ON OPE TIONS IN THE THIRD DISTRICT.

MISSISSIPPI RIVER COMMISSION,
THIRD DISTRICT,
Vicksburg, Miss., May 31, 190

COLONEL: I have the honor to submit the following report of operations in the t district, improving Mississippi River, for the year ending May 31, 1908.

This district was in the charge of Capt. G. M. Hoffman, Corps of Engineers, from beginning of the year to December 15, 1907, on which date it was transferred to m

The third district on the east side of the Mississippi River extends from the Coah Bolivar county line (365 L.) to the latitude of Warrenton, Miss. (606 L.), and on west side of the Mississippi River from Red Fork, Ark., along the right bank of Ar sas River to its mouth; thence along the right bank of the Mississippi River to latitude of Warrenton. The work on this section of the river includes bank revetn at Lake Bolivar front, Ashbrook Neck, Greenville, Longwood, and Fitler Bend, M Lake Providence, Louisiana Bend, Delta Point, and Reid-Bedford Bend, La.; Fork, Ark.; the systematic improvement of Lake Providence Reach, which has b discontinued; and levee construction in the Lower Yazoo (Mississippi) and U Tensas (Louisiana and Arkansas) levee districts.

PART 1.—CHANNEL WORK.

Lake Bolivar front, Miss. (417 L.)—(For description and previous history see Re Chief of Engineers, 1903, Supplement, page 220.)

See current summary and map No. 1[a] herewith.

The work during the past season included revetment construction made neces by the continued recession of Island No. 76 and the resulting destruction of al 1,200 feet of the old revetment. A breaking down of the upper bank revetn from stations 15 to 21 had also taken place. Active caving had continued as the r fell, as far up as station O, and was still in progress when work was begun.

Revetment party No. 1 arrived on the work October 10 from Lake Providence, began preparations for mat building. The repair work was finished on December and the party transferred to Greenville.

Two channel mats were built of standard width; No. 1, 816 feet and No. 2, 460 fe length, covering the space between stations 3 and 15. After the mats had been s and the upper bank graded the river rose rapidly, and it became necessary to const a number of connecting mats of various sizes to connect with the upper bank pav These mats contained 1,195 squares. The necessity of these mats, nine in num was occasioned by the continued rise in the river requiring a second line of shore m stations 10 to 18, to connect the upper bank paving with the channel mats.

The bank was graded by the hydraulic grader for a distance of 1,980 linear between stations 3 and 21. This includes the supplementary grading necessary repairs between stations 18 and 21. Grading was to a slope of 1 on 3, and about 70 cubic yards of earth were moved, at a cost of 3½ cents per cubic yard, or $1.24+ linear foot of bank. Add to this the cost of dressing the grade with sho 29— cents per linear foot, makes the cost per linear foot of completed grade $1.53

The paving was carried to an elevation of 38 feet on the Arkansas City gauge. F stations 3 to 9 the paving was riprap, 6 to 8 inches deep, and from stations 9 t quarry spalls were used.

Minor repairs to the original work were made at a cost of $315.92, repairing wash slope and reopening drains to prevent indiscriminate passage of surface water the slope, which, it is believed, was the cause of the break in the upper bank re ment, stations 18 and 21.

Stone was used from the reserve at Greenville, Miss., 2,540.3 cubic yards being to to the work, and 3,516.9 cubic yards were used from the reserve left on the ban Bolivar.

During the rise in January, 1908, after the repairs were finished, a slough in upper bank developed between stations 18 and 21, resulting in the loss of 300 li feet of paving, and necessitating the return of the working outfit to make rep

[a] Not printed.

Repairs were made by regrading and repaving the bank and putting in a small connecting mat to extend out to the mats already in place. This work was begun February 7 and finished February 19, 1908, and the outfit towed to the fleet at Vicksburg.

The field cost of work at Lake Bolivar for the season amounted to $59,426.47. (For details of work done, cost, etc., see statement No. 1, hereto appended.)

From all indications it will be necessary, in order to preserve the revetment now in place, to build 1,000 feet of reenforcing work the present season, so as to check the tendency to flank this revetment, due to the rapid recession of Island 76, which allows the direct force of the current to strike the revetment near the upper end.

Ashbrook Neck, Mississippi (*446 L.*).—(For description and previous history see Report Chief of Engineers, 1903, Supplement, p. 220.)

See current summary and Map No. 2[a] herewith.

No repairs were made to this revetment during the season, as none were deemed necessary. The entire work appears to be in good condition.

Greenville Harbor, Mississippi (*478 L.*).—(For description and previous history see Report Chief of Engineers, 1903, Supplement, p. 221.)

See current summary and map No. 3[a] herewith.

The damage sustained by this work during the past season consisted of a general lowering of the subaqueous revetment between stations 70 and 83, as indicated by the settlement of the upper bank paving between Dikes 4 and 5, 5 and 6, and 6 and 7; the caving back of the bank above the head of the work, which, if allowed to continue, would have destroyed the upper end of the revetment by flanking; and damage done by the rapid current flowing across exposed points, stations 102–106, 143–3, and 54–58.

The work proposed was the extension of the present revetment 400 feet upstream to resist the threatened flanking action at that point; the construction of pocket mats between the above-numbered dikes, stations 70 to 73; and paving with raprap across the exposed points; cleaning out all surface drains, and repairing washes and defects along the entire revetment.

Repairs were begun December 15, 1907. A channel mat 416 by 200 feet was built, extending from station 98, to connect with the original work at station 101, and two pocket mats were constructed to join this mat with the upper bank work. The upper bank was graded and paved with riprap, the grading being done by hand, as the machine was in service at Fitler Bend at the time. Connecting mats were constructed between Dikes 4 and 5, 5 and 6, and 6 and 7, containing 756 squares, and minor repairs were made to the upper slope in front of these mats.

The cost of this work was $19,595.35.

After the water receded within the banks, a small force was employed during June, July, and August revetting exposed points, stations 102–106, 143–3, and 54–58, and in cleaning out ditches. This work cost $5,600.74, making the total cost of the season's repairs $25,196.09. (For details of work done, cost, etc., see statement No. 2, hereto appended.)

It may be found necessary the present season to reenforce the revetment from stations 70 to 85 by constructing mats between Dikes 5–6, 6–7, and 7–8 by connecting the foundation mats upon which the dikes were originally built by a mat of standard width, or possibly by building a continuous revetment between stations 75 and 90. The necessity for this work can best be determined after the annual revetment survey is completed and results compared with former surveys.

Work at this point was completed January 16, 1908, and the party moved to Red Fork on the Arkansas River, to begin work at that point.

Longwood, Miss. (*500 L.*).—(For description and previous history see Report Chief of Engineers, 1905, Supplement, p. 198.)

See current summary and map No. 4[a] herewith.

Conditions in this bend have so changed that there is no need for an extension of this revetment, it having served the purpose for which it was originally intended.

Louisiana Bend, La. (*522 R.*).—(For description and history see Report Chief of Engineers, 1903, Supplement, p. 221.)

See current summary and map No. 5[a] herewith.

The condition of what remains of this revetment at the upper end is about the same as last season. No work was done and none is recommended.

Lake Providence reach (*517–552 R.*).—(For description and history see Report Chief of Engineers, 1903, Supplement, p. 221.)

See current summary and map No. 6[a] herewith.

No work was done during the year for the improvement of the reach.

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[a] Not printed.

Lake Providence, La. (*540 R.*).—(For description and previous history see Report Chief of Engineers, 1903, Supplement, p. 222.)

See current summary and map No. 6[a] herewith.

Work here consisted of completing the unfinished repairs of the preceding season, viz: Finishing the upper bank paving, stations 66–74; constructing a reinforcing mat, stations 18–28, and repairing the upper slope along this section of the revetment.

Revetment party No. 1 was organized at Vicksburg and arrived at Lake Providence August 21, 1907. The repairs to the upper bank, stations 66–74, were completed on the 28th. A channel mat 865 by 250 feet was constructed between stations 18 and 28 and the upper bank graded by hand and repaved along this stretch where it had been destroyed. The work was finished October 7, and the party moved to Bolivar.

The lower part of this work is just above a point subjected to a rapid current with a steep under-water slope and a siping bank. Later in the season this began sloughing and settling, and it became necessary at the close of the season to build two shore mats to cover this defect. This was done by revetment party No. 2 after the revetment at Fitler Bend had been finished. The mats were sunk between stations 21 and 26 at a high stage of water, covering the defective portion of the slope which was under water. Each of these mats was 250 by 100 feet.

About 130 linear feet of bank was regraded to the water line and 90 squares of paving laid. The work occupied ten days and was completed January 31, 1908, when the party was disbanded and the outfit towed to the fleet at Vicksburg.

Considerable time was lost early in the season on account of failure of the contractor to furnish brush in sufficient quantities. Part of this delay was due to the fault of the contractor, but the principal part was due to the fact that sufficient barges were not always available to allow the contractor to work to the best advantage.

The cost of the work done by party No. 1 was $30,010.44; by party No. 2, $4,767.17, a total of $34,777.61. (For details of work done, cost, etc., see statement No. 3, herewith.)

Fitler Bend, Miss. (*550 L.*).—(For description see current summary and map No. 7[a] herewith.)

The project for the season's work was the construction of 2,000 linear feet of revetment, stations 19 to 40, to prevent the further caving of the bank, which seriously threatened the important levee in the rear.

Work was commenced October 23, 1907, the delay in getting the second revetment party in the field being occasioned by waiting for new mattress boats. Two channel mats, 800 feet and 1,150 feet in length, respectively, and seven pocket mats were constructed, covering approximately 2,000 linear feet of bank. The two channel mats contained 4,884 squares and the seven pocket mats 1,013 squares, a total of 5,897 squares of mattress work.

The hydraulic grader could not be had for this work until December on account of being in service elsewhere. It was operated with two shifts of eight hours each, the entire grading being completed in 20 days, at the rate of 104 linear feet per day, at a cost of $1.20+ per linear foot. The cost of dressing the slope with shovels was 24+ cents per linear foot, making the total cost of bank graded $1.44+ per linear foot.

Thirteen hundred and thirty-one squares of bank were paved, the top of the paving being laid at the 36-foot stage of the Lake Providence gauge.

The cost of the work was $66,434.60, or $33.22— per linear foot. (For details of work done, cost, etc., see statement No. 4 herewith.)

As the river was constantly rising, it was necessary to build foot mats along the entire length, so as to make a proper connection between the upper-bank slope paving and the subaqueous work. These mats were liberally ballasted with stone, which should be better distributed at low water, and additional stone put on. It is estimated that this work will cost about $1.50 per foot, which would make the cost of the work approximately a little less than $35 per linear foot.

During the latter part of October and until about the middle of November the force was small, and practically no labor could be procured in the vicinity. On November 9 the first shipment of men was received from Memphis, Tenn., and it was necessary to continue these shipments weekly until about the middle of December to keep up the force.

Work was delayed somewhat on account of lack of brush, but this was due to the fact that a sufficient number of material barges was not available for the use of the contractor.

The work was finished January 21, 1908, and the party moved to Lake Providence.

Delta Point, La. (*598 R.*).—(For desciption and history, see Report Chief of Engineers, 1903, Supplement, page 223.)

See current summary and map No. 8[a] herewith.

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[a] Not printed.

The revetment is apparently in good condition, and with exception of some minor repairs to the upper bank, will require no repairs the present season. No work was done here during the past year.

Reid-Bedford Bend, La. (603 R.).—(For desciption, see current summary and map No. 9 [a] herewith.)

An examination of this revetment made the latter part of the season showed that the bank from station 36, the head of the work, to near the lower end, station 54, had caved back so as to leave a space of from 100 to 200 feet between the mattresses and the shore. Above and below the mattresses the caving had been much greater, showing that the work already done had had some effect in restricting the caving, which for several years past has been extremely active in this bend. It was found that much more extensive repairs would be required than the short working season would permit, as it would be necessary practically to reenforce the entire length of the revetment by the construction of new mats, grade and pave the upper bank, and extend the revetment upstream in order to make the work effective. Because of this and the lateness of the season and short time yet remaining when revetment work could be done, work was deferred until next season, as there was no immediate danger of the caving extending back far enough to jeopardize the safety of the levee.

Red Fork, Arkansas River.—(For description, see current summary, and map No. 10 [a] herewith.) The work proposed was the construction of a revetment below Bennetts Landing for a distance of about 600 feet in order to protect an important new levee under construction.

After completing repairs at Greenville, revetment party No. 1, with part of the outfit, was towed from that place, arriving at Red Fork January 19, 1908.

A mat 640 feet long and 125 feet wide was constructed; the bank graded with hydraulic grader and paved with riprap from the junction of the inner edge of the mat to within 8 feet of the top of the bank. The brush and poles had been loaded in advance at the mouth of the Arkansas River. Stone for the work was brought from the Ohio River on new barges belonging to the United States.

During the time of revetment construction, the stage of water was low and favorable for work. The revetment was finished February 1 and the outfit towed to Vicksburg.

The total cost of the revetment was $9,474.17, or $14.80 per linear foot. (For details of work done, cost, etc., see statement No. 5 herewith.)

STONE.

Loading stone from the reserve at Greenville, Miss., for 1907 revetment work, was begun October 1, 1906. One foreman and a force averaging 20 men and six teams were employed; labor $1.25 and teams $2.75 per day. Loading was discontinued January 7, 1907. Below is given a detailed statement of stone loaded, and cost:

Month.	Cubic yards.	Labor.	Teams.	Tug, etc.	Totals.	Cost per yard.
1906.						
October	2,210.1	$449.00	$206.25	$40.47	$695.72	$0.3148–
November	384.1	105.68	41.25	197.50	344.43	.8967+
December	1,746.3	372.65	181.50	395.24	949.39	.5437–
1907.						
January	850.0	176.18	103.81	208.08	488.07	.5741+
Total	5,190.5	1,103.51	532.81	841.29	2,477.61	

Cost per cubic yard for—

Labor	$0.2126+
Teams	.1027
Tug, etc	.1620+
	.4773+

Operations at the quarry were begun January 18, 1907, the organization, towboat, and a portion of the labor being transferred direct from the Lake Providence revetment work. The method pursued was the same as for previous seasons, viz, stone drilled and blasted in 20-foot lifts, broken by hammer to desired size, and loaded over a platform barge by means of dump carts. With exception of six days, February 20–25, there was a good navigable stage of water throughout the season.

[a] Not printed.

A total of 18,175 cubic yards were quarried and loaded during the season, and the quarry placed in first-class condition, all spalls and trash removed, the top bench stripped for a length of 200 feet, and about 1,000 cubic yards of stone drilled.

In order to maintain a sufficient force of laborers it was necessary to import men during March, April, and May, the cost of which was about $550. Operations were suspended May 31 and the floating plant towed to Vicksburg.

Below is a statement of the various items of work and cost:

Classification.	Cubic yards.	Cost.	Cost per yard.
Supervision	18,175	$982.70	$0.0541–
Stripping	28,500	3,768.83	.1322+
Drilling	14,000	2,616.05	.1868+
Blasting	15,500	1,096.15	.0707+
Breaking	18,300	3,839.07	.2098–
Loading	18,175	5,448.72	.2998–
Care of plant	.....	320.00	.0176+
Sundries	.....	724.09	.0398+
Vicksburg office	.....	481.80	.0265+
Total	.....	19,277.41	1.0373

The season's towing was done by the steamer *H. St. L. Coppee* with a double crew, the boat being transferred from the Lake Providence revetment work January 17. The first tow, consisting of five material barges, loading barge, and one quarter boat, arrived at the quarry January 25. On January 27 the boat was transferred to levee protection, remaining in this service until February 17, when towing was resumed. Nine tows, containing 18,175 cubic yards of stone, were delivered at Greenville, the last tow arriving June 8. In addition to the above work the boat delivered one barge of stone to Reid-Bedford, and made one trip to Vicksburg for material barges.

Below is a statement of the cost of the various expenditures:

Month.	Yards towed.	Pay roll.	Subsistence.	Material.	Total.
1907.					
January	.....	$409.77	$100.40	$490.64	$1,000.81
February	1,790.9	739.80	147.36	697.96	1,585.12
March	4,343.1	1,322.49	365.63	1,355.85	3,053.97
April	6,755.5	1,336.34	364.36	1,153.49	2,854.19
May	3,791.8	1,350.02	360.58	1,203.74	2,914.34
June	1,493.7	392.00	117.30	287.67	796.97
Total	18,175.0	5,560.42	1,455.63	5,189.35	12,205.40
Engineer office, sundry charges, etc	.....	.....	.....	.....	831.20
Total charges	.....	.....	.....	.....	13,036.60

Cost per unit statement.

	Per day.	Per yard.
Pay roll	$45.207–	$0.3059+
Subsistence	11.835–	.0801–
Material	42.190–	.2855+
Sundry charges, etc	6.758–	.0457+
Total	105.99 –	.7172+

The work of unloading was begun January 28 and continued until June 7, 1907. One foreman and a force averaging 35 men were employed. The price paid for labor was $1.25 per day.

A total of 21,522.9 cubic yards of stone was unloaded from barges to the reserve. Of this amount, 2,852.6 cubic yards were purchased from Oscar F. Barrett, 17,030.9 cubic yards received from the Government quarry, and 1,639.4 cubic yards loaded from the reserve for use on revetments but subsequently not needed. Below is given a detailed statement of this work:

Month.	Cubic yards.	Labor.	Tug, etc.	Total.	Cost per yard.
1907.					
January	850.0	$235.38	$200.53	$435.91	$0.5658–
February	3,635.8	568.24	350.00	918.24	.2402–
March	3,973.3	853.20	175.27	1,028.47	.2588+
April	5,919.2	1,155.88	183.65	1,339.53	.2263+
May	4,532.3	948.53	198.65	1,147.18	.2531+
June	2,612.3	556.39	60.73	617.12	.2362+
Total	21,522.9	4,317.62	1,168.83	5,486.45	.2544+

Cost per cubic yard for—

Labor	$0.200+
Tug, etc	.054+
	.254+

Summary of cost.

Cost per cubic yard to—

Quarry and load	$1.0373
Tow	.7172
Unload	.2540
Total	2.0085

Quarrying the present season began January 14, 1908, with a small force, the first tow of barges for the quarry arriving February 23. A total of 14,002 cubic yards of stone has been quarried and loaded on barges; 11,217 cubic yards delivered at Greenville; and one tow of six barges containing 2,300 cubic yards en route.

In order to increase the output of the quarry a 40-horsepower boiler and two steam rock drills were installed, the object being to get sufficient stone quarried in advance so that the entire towing season could be utilized.

For several seasons past only sufficient material barges have been available to keep one towboat in service, and this outfit has afforded ample towing facilities to keep up with the quarrying. With the increased appliances for drilling, and the additional material barges recently built and under contract for use in this district, it is expected to increase the yearly output of the quarry to 30,000 cubic yards.

The principal drawback to the location of this quarry is the short boating season on Little Red River, lasting usually from four to five months, from about the middle of January to about the 1st of June, during which time all the stone has to be towed out to deep water.

While the cost of the stone is about the same as that purchased under contract, the advantages of obtaining it by our own force are: First, having a reserve of stone always on hand that can be loaded as needed; second, avoiding delay to revetment parties on account of nondelivery of stone when urgently needed, often a matter of vital importance; and third, by giving employment to experienced men, whose services it is desirable to retain, so as to have them available when revetment work begins, thus keeping up the nucleus of an organization.

The cost of quarrying and loading stone so far this season is 89 cents, towing 73 cents, and unloading 19 cents, a total of $1.81 per cubic yard.

Reserve stone on the bank is as follows:

Greenville, Miss., 35.369.47 cubic yards, valued at	$69,432.50
Lake Bolivar, Miss., 978.80 cubic yards, valued at	2,255.05
Lake Providence, La., 445.30 cubic yards valued at	1,305.13

Total, 36,793.57 cubic yards, valued at $72,992.68.

PLANT.

With the addition of new plant authorized, a greater part of which has been co structed, the available plant for revetment work will consist of:

2 towboats.
1 inspection and survey boat.
1 tug.
2 hydraulic graders.
6 mattress boats.
4 mooring barges.
14 material barges, first class.
9 material barges, second class.
10 material barges, third class.
2 line barges.
1 barge fitted for loading stone.
2 field office quarter boats, and
8 laborers' quarter boats.

The hydraulic grader authorized last year is under construction. It is expected t have this grader and two new mattress barges ready in time for the present season work. This will give sufficient plant for the outfitting of two revetment parties.

The present repair outfit consists of:

1 office quarter boat.
1 machine shop.
1 carpenter shop.
1 dry dock, and
5 calking flats.

The allotment of $15,000 for a new dock has not been expended. Plans and est mates were made for ponton docks, also single docks of steel, wood, and with ste frames, and deck, sides, and bottom of plank creosoted. The estimated cost varie from $13,000 to $33,000. As the old dock can be made serviceable for barge work t last for one or two seasons longer at an expense of $400 or $500, it was decided to del the construction of a new dock with a view to obtaining additional funds.

The cost of care of plant for the year was $10,450.47. Repairs cost $47,660.7 The average number of employees engaged in care and repairs of plant during th year was 53.

Details of repairs, and list of floating plant of the district are given in statemen Nos. 6 and 7, respectively, appended hereto.

Operations under the heads Channel Work, Stone, and Plant, were under the imm diate supervision of Mr. Arthur Hider, assistant engineer. The foregoing report an statements appended thereto embody the essential features of his detailed report which have been filed at this office.

PART II.—SURVEYS.

This work was undertaken under the usual project, and in addition surveys to asc tain the present condition and cost of improving the Arkansas River levees from Pi Bluff to Red Fork (south bank) and to investigate the feasibility and cost of dive ing Cypress Creek into interior streams tributary to Red River. The regular ann allotment was increased to $7,500, to which was added $2,500 to cover the cost of t Arkansas River and Cypress Creek diversion surveys.

The surveys made were of three general kinds, as follows: Revetment, revetme and reach combined, and hydrographic reach and shore line surveys. The fi includes laying out and retracing base line and marking off same into stations of 1 and 200 feet, at which points ranges are set along the full length of the revetme The ranges are sounded across the width of the revetment and beyond, and at int vals of about 2,000 feet they are sounded across the entire width of the river. T second includes, in addition to the revetment survey as above, a reach survey exte ing beyond the limits of the revetment. The third includes a shore line located alo the full reach surveyed, and at intervals of about 2,000 feet ranges are laid off a sounded the entire width of the river. The existing levee lines also are retraced a other prominent features are located where necessary.

The new survey steamer *Control* (formerly *Scimitar II*), purchased last season, w used for the season's work on the Mississippi River. The channel surveys were ma covering two periods:

First. The steamer was put in commission and party organized May 13, 1907, a hydrographic-reach, shore-line, and levee-location surveys were made as follo Warfield Chute (483 L.); Leland Neck (470 R.); Ashbrook Neck (447 L.); Walk Bend (487 R.); Stack Island Chute (539 L.), and Cottonwood Chute (560 L.). P posed new levees were located at Warfield, Stack Island, and Cottonwood. Fie work was completed May 29, the steamer laid up, and party disbanded on the 30th Vicksburg. The field notes were reduced and platted, and blueprints and record results were made.

Following is a statement showing work done in detail, together with cost, etc.:

Locality.	Miles below Cairo.	Extent of survey	Levees located.	Ranges sounded.
Reach surveys.		*Miles.*	*Miles.*	
Warfield Chute	483	3.4	1.7	6
Stack Island Chute	539	2.7	1.6	6
Cottonwood Chute	560	4.0	1.5	7
Total.		10.1	4.8	19
Shore-line surveys.				
Leland Neck	470	.6		
Ashbrook Neck	447	.5		
Walkers Bend	487	.3		
Total		1.4		

Statement of cost.

	Cost.	Percentage.
Pay rolls	$563.33	56
Subsistence	168.07	17
Coal	185.25	19
Miscellaneous supplies	76.30	8
Total	965.95	100

Days party actually worked	10.2
Days lost, account Sundays, legal holidays, and rain	2.5
Days lost moving	4.3
Total	17.0
Total cost per day of party in the field	$56.82
Cost per mile of reach and levee-location surveys	87.50
Cost per mile of shore-line surveys	65.00

Second. The party was reorganized, the *Control* put in commission August 19, and the following low-water surveys made:

Revetment surveys.—Lake Bolivar Front (413–418 L.); Ashbrook Neck (445–447 L.); Greenville Harbor (477–479 L.); Longwood (500–502 L.); Louisiana Bend (512–514 R.); Lake Providence (540–542 R.); Fitler Bend (550–553 L.); Delta Point (597–599 R.); and Reid-Bedford Bend (603–607 R.).

Shore-line and reach surveys.—Red Fork Bend (Arkansas River); Chicot Front (427–433 R.); Rowdy Bend (450–452 R.); Leland Neck (469–471 R.); Walkers Bend (485–490 R.); Matthews Bend (506–510 R.); Wilsons Point (534 R.); Promised Land (546 L.); and Duckport (590–592 R.). The surveys were completed at Red Fork on the Arkansas River. The party was disbanded at Rosedale, Miss., November 7 and the *Control* turned over to the district officer and party for an inspection trip.

Following is a statement showing work done in detail, together with cost, etc.:

Locality.	Miles below Cairo.	Extent of survey.	Ranges sounded	
			Across river.	Revetment.
Revetment surveys.		*Miles.*		
Lake Providence	540–542	2.6	12	[illegible]
Greenville Harbor	477–479	.4	2	[illegible]
Do	477–479	2.2	7	[illegible]
Total		5.2	21	[illegible]
Revetment and reach surveys.				
Bolivar Front	413–418	3.8	6	[illegible]
Ashbrook Neck	445–447	3.3	8	[illegible]
Longwood	500–502	1.6	8	[illegible]
Louisiana Bend	512–514	2.2	3	[illegible]
Fitler Bend	550–553	6.1	11	[illegible]
Delta Point	597–599	2.3	6	[illegible]
Reid-Bedford Bend	603–607	7.7	10	[illegible]
Total		27.0	52	[illegible]
Reach and shore line surveys.				
Rowdy Bend	450–452	3.0		
Do		4.5	7	
Leland Neck	469–471	3.4	5	
Walkers Bend	485–490	2.5	5	[illegible]
Matthews Bend	506–510	5.7	7	
Wilsons Point	534	.9		
Promised Land	546	2.2	6	
Duckport	590–592	2.0		
Chicot Front	427–433	6.2	6	
Red Fork Bend (Arkansas River)		1.4	7	
Total		31.8	43	[illegible]

Statement of cost.

	Cost.	Percentage.
Pay rolls	$2,574.67	[illegible]
Subsistence	672.55	[illegible]
Coal	935.54	[illegible]
Miscellaneous supplies	253.69	[illegible]
Total	4,436.45	[illegible]

Days party actually worked	47.[illegible]
Days lost account Sundays, legal holidays, and rain	19
Days lost moving	13.[illegible]
Total number of days in field	80
Total cost per day of party in the field	$55.4[illegible]
Cost per mile of revetment surveys	234.[illegible]
Cost per mile of revetment and reach surveys	80.[illegible]
Cost per mile of reach and shore line surveys	33.[illegible]

It will be noted that while there was an increase in the total per diem cost of abou $10, due to using the larger steamer, which required a larger crew and which caused considerable increase in the coal bill, more work was accomplished in about the sam time; hence the unit cost per mile of the various surveys was about the same as th previous year. The party was made up as nearly as possible of the men who serve during the previous season. (For detailed description of methods of making survey etc., see Report Chief of Engineers, 1904, vol. 9, p. 241.)

Most of the notes were reduced in the field, and as far as possible field sheets wer also platted. These were sent to the office and the finished sections and drawing made, with few exceptions, by the office draftsman. All the maps and sections wer finished soon after the completion of the field work.

Comparison with previous surveys and discussion of results are made as follows:

Lake Bolivar revetment and reach (*413–418 L.*). (*See map No. 1*[a] *herewith.*)—Caving at the foot of Island 76 has continued with increased activity. The active scour now sets in to the revetment at range 0+70, leaving only 470 feet of the upper end of the original revetment masked by the island. Quite a general failure of the unreenforced portion of the work was indicated. The upper bank work had failed and active caving had taken place at ranges 1+75 to 12+62, and the upper end of the new work of 1905–6 was involved to some extent. The reenforcement from range 18+75 down appears to be holding well. Ranges 1+58 to 8 south show a general fill over the revetment. The bar line advanced slightly along the entire front. The shore line below the revetment has not changed materially.

Ashbrook Neck revetment (*445–447 L.*). (*See map No. 2*[a] *herewith.*)—The survey indicates that the revetment is impinged by the main river along its entire length. The soundings indicate very little change from the previous survey. There was no caving above the revetment, but it was very active below. The zero of the bar line has retreated slightly above range 97, while below that point it has advanced, particularly at the extreme lower end of the revetment, where the advance has amounted to about 600 feet.

Greenville Harbor revetment (*477–479 L.*). *See map No. 3*[a] *herewith.*)—Above the revetment the shore line shows very slight caving. Notwithstanding a very active attack along the full length of the work, the revetment is in good condition except a slight indication of failure at the following points: Upper ranges 100 to 103 showed considerable scour over entire width of sections; at upper range 115 a scour is indicated, and at ranges 122 to 123, and the extreme lower end of the existing revetment (ranges 69 to 75) shows a general scour. Sections were sounded below the revetment at ranges 76 to 94. The under-water slopes at ranges 78 to 82 are very steep, with a tendency to scour that might cause a cave here at any time. The zero of the bar line has receded except at the extreme lower end, where an advance of about 300 feet is noted.

Longwood revetment and reach (*500–502 L.*). (*See map No. 4*[a] *herewith.*)—The survey indicates that along the entire revetment the mattresses are covered with from 5 to 35 feet of deposit, which extends over the upper bank work from the upper end to range 28. There is practically no change for 2,000 feet below the revetment, from which point active caving continues to the lower limits of the reach. The bar exists in about the same relative shape as last season, being completely covered at about a 7-foot stage.

Louisiana Bend revetment (*512–514 R.*). (*See map No. 5*[a] *herewith.*)—There has been practically no change in the conditions along this revetment in the past several years. The effective revetment extends from ranges 88 to 120. The upper end is covered by the Ashton bar, and the lower end has been destroyed. The shore line below the effective revetment has changed only slightly.

Lake Providence revetment (*540–542 R.*). (*See map No. 6*[a] *herewith.*)—The Longwood bar has continued to make downstream, and now masks the upper end of the revetment, ranges 140 to 116. The deep water at the upper end has shifted toward the Mississippi shore about 1,000 feet. A general fill is indicated to range 96; thence to range 26 slight alternate scour and fill are indicated; and ranges 26 to 20 show general scour over the entire revetment, with evidences of failure involving the upper bank protection. The zero of the bar line changed only slightly, there being a slight alternate advance and recession.

Fitler Bend revetment and reach (*550–553 L.*). (*See map No. 7*[a] *herewith.*)—Caving continued throughout the entire reach, together with a general advance of the zero of the bar line. A base line 4,600 feet long was laid out, and sections sounded 200 feet apart. The reach ranges indicated a general scour and recession along the proposed revetment.

Delta Point revetment and reach (*597–599 R.*). (*See map No. 8*[a] *herewith.*)—The shore line above the head of the revetment continues to cave slowly. The effective revetment appears to be in good condition, the soundings showing very little change from the previous survey.

Reid-Bedford Bend revetment and reach (*603–607 R.*). (*See map No. 9*[a] *herewith.*)—The reach survey indicated very rapid caving along the entire reach, except immediately back of the mattresses sunk in 1906–7. There was a general advance of the zero of the bar line. A base line 7,600 feet long was laid out and ranges sounded 200 feet apart. Excepting the river ranges there were no previous sections for comparison. It is evident, however, that the inside shore line has flanked the head of the mats sunk at ranges 36 to 44. Here the mat has either broken up or its position is now on the Mississippi side of the deep water.

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[a] Not printed.

Red Fork Bend reach (*Arkansas River*). (*See map No. 10[a] herewith.*)—This survey was made to determine the condition of the under-water slopes and the probability of continued caving, which was threatening the large levee crossing the foot of Lake Belcoe, and which would breach the upper junction of the new levee being constructed by the commission. The results indicated that continued caving might be expected owing to the gradual failure by flanking of the bank revetment previously placed here.

Rowdy Bend reach (*450–452 R.*). (*See map No. 11[a] herewith.*)—Continued caving in this bend threatens to breach the large levee crossing an old river bed, locally known as the Panther Forest short line levee, and the survey was made to determine the probable future progress of the caving. The result indicates a continuation of the caving at about the same rate as for the past several years—about 100 feet per year—which would within three years seriously threaten the lower junction of the new levee just completed.

Leland Neck reach (*469–471 R.*). (*See map No. 12[a] herewith.*)—Caving has continued with increased activity as compared with the previous survey. The nearest point from center of dike to river bank was reduced from 1,000 feet to 900 feet, due, however, to a pocket cave. The average recession amounts to about 150 feet per year, which would seriously threaten the dike within six years.

Walkers Bend reach (*485–490 R.*). (*See map No. 13[a] herewith.*)—Caving has continued with great activity throughout the reach. At the date of the survey the rate of caving showed about the same as the past few years, but since the survey it was observed that caving was very active, and measurements made in February, 1908, indicated that the bank had caved 270 feet in five months, directly opposite the threatened angle of the levee. If this rate of caving continues, the large levee known as the Whiskey Chute levee, crossing the upper end of Lake Chicot, will be seriously endangered within a year.

Matthews Bend reach (*506–510 R.*). (*See map No. 14[a] herewith.*)—Caving continued with greater activity than ever before opposite the new levee completed this season. The old levee is breached for a distance of 3,000 feet. Caving continues at about the same rate at the lower end of the bend. The Grand Lake levee crossing will be seriously threatened within about five years.

Promised Land reach (*546 R.*).—This survey was made in order to determine the condition of the under-water slopes and the possibility of the controlling levee line breaching during the season. Very rapid caving was shown, and the sections sounded indicated that it would continue. A new levee was contracted for and completed covering the threatened levee.

Warfield Chute reach and levee (*483 L.*).—This survey was made to determine the extent of scour in the chute and the probability of the controlling levee line breaching, and to recommend a location for a new levee. A new levee was located, but construction of same was not considered necessary this season.

Stack Island Chute reach and levee (*539 L.*).—Surveys were made in May and again in November. The first survey was made to determine the probable extent the controlling levee line would be breached, and to make location for a new levee. The second survey was made to determine the extent of scour in the chute and the possibility of the main river following this route. Special report and maps were submitted to the Commission February 8, 1908.

Cottonwood Chute reach and levee (*560 L.*).—This survey was made to determine the extent the controlling levee would be breached, and to recommend a location for a new levee.

ARKANSAS RIVER LEVEE AND CYPRESS CREEK DIVERSION SURVEY.

A party was organized and outfitted at Pine Bluff, Ark., in August, 1907, consisting of a junior engineer as chief of party, with transitman, levelman, rodman, two chainmen, three laborers, cook, and teamster, with double team for transfer of party from point to point. Tents were used for quarters, and the two surveys were made with practically the same organization.

The levee survey consisted of an azimuth line for alignment, obtaining distances by chaining. There were no established geographical points from which to start the survey, and azimuths were checked by observations on Polaris at intervals. No attempt was made to take latitude and longitude observations. The magnetic variation was found to be 6° 32″ E., just below Pine Bluff, and subsequent observations were found to agree practically with the above value. Topography adjacent to the transit line was sketched in.

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[a] Not printed.

A checked line of ordinary levels was commenced from the U. S. Coast and Geodetic Survey P. B. M. "N" at Pine Bluff and carried all the way through, elevations being referred to the Memphis datum. The method used was to run from 3 to 4 miles forward and check back in loops. The greatest allowable error of closure was 0.1 foot, the error within this amount being adjusted at the extreme bench before proceeding on the next loop. The levels were carefully run; the final check at Red Fork on bench marks, whose elevations had been established by levels run from precise bench marks on the Mississippi River, showing a discrepancy of 0.15 foot. Tree benches were established at intervals of about one-half mile, and gauges were set on the river side of the levee, graduated so the water level could be read direct to the Memphis datum. The existing levees were cross-sectioned at intervals of 500 feet, or oftener if necessary, to insure data sufficient to base estimates for enlargement.

The Arkansas River levee survey was completed October 15, the entire party and outfit were moved at once to the head of Boggy Bayou, the proposed point of diversion of Cypress Creek, and the diversion survey was commenced on the 16th.

A transit line was run similar to that on the levee survey, obtaining distances by stadia instead of chaining. Transit with vertical circle and stadia was also used for cross-sectioning existing water courses. Three check lines were run and tied on the controlling levee line, thus insuring a correct alignment survey. Careful ordinary levels were run, but owing to the existence of frequent bench marks on which to check, only a single line was run and a closure of within 0.2 foot was required on all existing bench marks checked on. The existing water courses and ground levels were cross-sectioned at intervals of about 1,000 feet, or as often as necessary to secure a correct estimate of required excavation work.

Permanent staff gauges were set at the following points: Cypress Creek (near point of diversion), head of Boggy Bayou, Boggy Bayou Crossing (St. Louis, Iron Mountain and Southern Railway), foot of Macon Lake, on Lake Chicot (head of Ditch Bayou), and on Bayou Macon near Eudora.

The survey was completed December 5, the party disbanded the day following, and the chief of party and instrumentmen proceeded to Vicksburg to reduce and plat the notes.

The transit surveys were platted on field protractor sheets, scale 1:10,000; nine sheets of the Arkansas River levee survey and eight sheets of the Cypress Creek diversion survey. Those were reduced by pantograph to a scale of 1 inch to 1 mile in order to make maps convenient for reference. Profiles were platted to a large scale on which to base estimates, etc., and which also were reduced to a suitable scale to incorporate on the inch-to-mile maps. The entire survey was thus assembled in three sheets. A tracing was also made of a section of the regular Commission alluvial map, scale 5 miles to 1 inch, showing the entire drainage area affected.

Following are statements showing work done, cost, etc.:

Work done.

	Arkansas River levee.	Cypress Creek diversion.
Net number of miles covered	71.1	55.2
Number of miles of side lines run	.....	7
Number of gages set	112	6
Number of bench marks established	134	98

Statement of cost.

	Arkansas River levee.	Cypress Creek diversion.
Pay rolls	$984.74	$886.32
Subsistence	261.27	193.17
Team hire and forage	200.82	203.74
Camp equipage and miscellaneous	231.03	283.35
Total field cost	1,677.86	1,566.58
Field cost per mile run	23.60	25.20

Summary of total survey expenditures for the period.

Field cost of channel surveys	$4,600.
Field cost of Arkansas River levee and Cypress Creek drainage surveys	3,244.
Total field cost of surveys	7,845.
Drafting and office expenses	1,650.
Charged to inspection trips, etc	492.
Total	9,988.

Additional details are contained in the reports of Mr. A. M. Todd, assistant engine which reports have been filed at this office.

Attention is also invited to report submitted March 30, 1908, in compliance w resolution of the Commission (Proceedings, June 26, 1907, p. 1242).

PART III.—LEVEE WORK.

Lower Yazoo levee district (365–592 L.).—(For detailed history, see Report, Chie Engineers, 1905, Supplement, p. 201, and reports of the Mississippi River Commiss since 1882.) This district has a levee line 188.5 miles long, extending from t Coahoma-Bolivar county line to a point on Eagle Lake, and covering a river front 213 miles. An isolated levee 8,800 feet long has been built near Vicksburg, in c nection with the diversion of the Yazoo River and the improvement of Vicksb Harbor. The area protected by the Upper and Lower Yazoo levee systems is 6,6 square miles—3,281 square miles in the upper and 3,367 square miles in the lower.

At the beginning of the year four of the 1905–6 contracts had not been complet One of these, stations 4025–4200 (476 L.), has since been completed by the placing 70,762 cubic yards, while under the remaining three, 117,595 cubic yards are requi to complete. Stations 4025–4200 were completed at an additional cost to the Uni States of $778.82, which has been charged against the contractors and their bondsm for payment. Two of these contracts, stations 1200–1375 (496 L.) and 1600-1 (503 L.) have been annulled. The completion of the last-named contract was let Lowrance Brothers October 30, 1907, at 36 cents per cubic yard. No work has be done. The annulled enlargement contract was advertised at the same time, but bids were received. Work on stations 1038–1226 (392 L.) was stopped February 1908, on account of the borrow pits being flooded from the Mississippi River.

Of the seven 1906–7 contracts, the one for topping stations 3586–3700 (547 L.) annulled by a supplementary contract, no work having been done on it. The ti limit has been waived on the other six of these contracts, viz, stations 1800–2000 (L.), 2100–2200 (514 L.), 2300–2440 (517 L.), 2950–3133 (534 L.), 3238–3491 (538 L and 3700–3910 (550 L.). One of these, stations 3238–3491, has been completed placing 140,995 cubic yards, while under the remaining five, 296,166 cubic yards h been placed, leaving 183,834 cubic yards yet to be placed. (For details, see statem No. 8, herewith.)

Under allotment of $225,000 from appropriation of June 30, 1907, eight contra amounting to 844,172 cubic yards, have been let. A total of 394,357 cubic yards h been placed on these, and 449,815 cubic yards are required for their completi (For details, see statement No. 8, herewith.)

The Mississippi levee board placed during the year 1,061,133 cubic yards. (details, see statement No. 9, herewith.)

The following table shows the length of new loops built and the length and yard of levees abandoned:

Location of new loops.	Miles below Cairo.	Station numbers of loops.			Length in feet.		Cub yar abs dom
		Beginning of new.	End of new.	End of old.	New levees.	Old levees.	
Black Bayou	476	3971+70	4021+75	4029+40	5,005	5,770	21
Baleshed	538	3250	3311+10	3302	6,110	5,200	11
Promised Land	547	3569	3603+35	3621+97	3,435	5,042	11
Cottonwood	557	4290+50	4363+26	4368+68	7,276	7,818	22
Duvalls	567	4766+47	4821+66	4820+33	5,519	5,388	12
Total					27,345	29,218	81

This gives a net decrease of 1,873 feet, or 0.36 mile, which reduces the length of controlling levee from 188.9 to 188.5 miles.

Summary of earth in place.

		Cubic yards.
In place April 30, 1907		39,225,231
Added by the United States	918,504	
Added by the levee board	1,061,133	
	1,979,637	
Lost and abandoned	810,000	
		1,169,637
In place April 30, 1908		40,394,868

Required to complete to Commission grade and section, about 12,200,000 cubic yards, at an estimated cost of $3,050,000. Expenditures by the United States since 1882 amount to $5,216,391.15, and by the levee board (exclusive of right of way, litigation, office expenses, etc.), to $3,814,220.

The season has been an average one for levee construction.

There was no renewal of sod by the United States, the levee board doing the small amount necessary. All of the weed cutting was done by the levee board this season, the expenditures for sodding and weed cutting amounting to $1,376.64.

The 16-foot gauges set last season every 2,500 feet between stations 3000 to 500 (432–490 L.), with elevations referred to Memphis datum, have proven very satisfactory and should be set the same distance apart throughout the district. Spikes were driven at the maximum heights of the April high water.

Surveys have been made to show defects of the levee and other conditions affecting levee construction, and a few special surveys of caving banks have been made since the high water of 1907.

Parker to Dennis (367–373 L.).—The shore has receded but little during the year. Caving has reached the banquette at station 270. A protection levee built by the planters to enable the crops to be gathered between the levees has prevented flood water standing against the new Australia loop (371 L.).

Waxhaw (392–394 L.).—Recession along the front has been uniform but not rapid, 3,000 feet of the old levee having caved into the river.

Terrene (395 L.).—There has been but slight change along this front.

Bolivar (417 L.).—The rapid caving last season which threatened to destroy the revetment and the levee crossing the head of Lake Bolivar has been stopped by revetment work placed this season.

Buck Ridge (418 L.).—This front is protected against rapid caving by the Lake Bolivar revetment.

Choctaw Bend (435 L.).—There has been but slight change along this front. The river is close to the levee at this point.

Bachelors Bend (475–479 L.).—A short mattress was placed at head of the old revetment work to prevent flanking. Caving continues above the revetment.

Warfield Point (484 L.).—There has been no caving this year. The bank of the chute is within 200 feet of the levee at station 245 and 300 feet at station 285. Two short loops of approximately 40,000 cubic yards may be required this season. This will be determined after high water.

Longwood Front (499 L.).—The short bank revetment built three years ago has prevented further caving. Protection is also afforded by a high and large sand bar immediately above. Caving continues at some distance below the revetment.

Valewood (528 L.).—There has been but slight change along this front. The old levee has not been breached by caving, but has been cut to admit the flood water against the new levee.

Baleshed (538 L.).—Caving last season made it necessary to build a new levee this season. The old levee in front has been cut. There has been some caving in the chute below the new loop.

Promised Land (547 L.).—Rapid caving along this front, which is pure sand, developed during low water, reaching within 50 feet of the levee. A new loop was constructed this season. Unless the sand bar immediately above this point continues to make down, renewed caving is expected as soon as the river has receded to a stage of 10 feet on the Lake Providence gauge.

Fitler (552 L.).—Caving has been active for the last two seasons. About 2,000 feet of revetment was built this season, which may be flanked by caving immediately above it. Caving also continues below the revetment. A hydrographic survey will be made as soon as conditions permit.

Cottonwood (556 L.).—Caving in the chute this season has been slight as compared with last season, when 2,000 feet of the main levee caved off. A new loop was constructed by the levee board this year.

Duvalls (568 L.).—Caving has continued in this bend. The new loop under construction last season by the levee board has been completed. The old levee in front has been breached by caving.

Albemarle (569 L.).—Caving in this bend has advanced slightly during the season. The old levee in front of the Albemarle loop built three years ago has not been breached.

With the completion of the work now under contract the condition of the levees with reference to the highest water will be as follows: The entire levee, 2 feet or more above. This includes 23.2 miles of reduced section, 4 to 6 foot crown and 2 to 1 river side slope. The levee is reenforced by banquette as follows: Sixty-two miles with grade 4 feet below highest water; 70 miles with grade 6 feet below; 10.9 miles with grade 8 feet below; 10.8 miles with grade 12 feet below, and 35.1 miles without banquette.

After the recession of the 1907 high water a provisional grade was adopted of 3.5 feet to 4 feet above the highest water for the standard section, and to add a light topping 1½ feet high, with crown of 2 feet and slopes of 2 to 1. The following is an approximate estimate of the yardage required for completion of the levee to this grade:

	Cubic yards.
Enlargement to grade 4 feet above highest water	8,423,4[illegible]
Banquette to grade 4 feet below highest water	1,505,5[illegible]
Increase of slopes of exposed fronts from 3:1 to 4:1	1,300,0[illegible]
Probable new loops during next three years	1,000,0[illegible]
Total	12,228,9[illegible]

The project for next year's work contemplates enlarging the lowest and weakest and those of reduced section to the above grade.

Estimates for such enlargement have been made as follows:

Station.	Miles below Cairo.	Grade above 1903 high water.	Estimated contents.	Estimated price.	Amount.
Above Greenville		*Feet.*	*Cub. yds.*	*Cents.*	
450-640	373	4	140,000	25	$35,0[illegible]
900-965	380	4	110,000	25	27,[illegible]
965-1038	381	4	109,000	25	27,[illegible]
2070-3130	404	4	94,000	25	23,[illegible]
Below Greenville:					
1345-1375	499	2	31,000	30	9,[illegible]
1570-1645	502	4	132,000	27	35,0[illegible]
4500-4595	565	4	96,000	22	21,1[illegible]
4595-4670	566	4	97,000	22	21,3[illegible]
Total			809,000		200,0[illegible]

The field expenditures in this levee district for the year ending May 1, 1908, amounted to $202,140.85, of which 93.4 per cent was for construction, 1.7 per cent for surveys and high water, and 5.4 per cent for engineering.

Work in this levee district was under the immediate supervision of Mr. E. C. Tollinger, assistant engineer. The above report and appended tables include the essential features of his detailed report, which has been filed at this office. (See maps Nos. 15, 16, 17, and 18, hereto appended.)

Upper Tensas levee district (402–606 R.).—For detailed history, see Report Chief of Engineers, 1905, Supplement, p. 203, and reports of the Mississippi River Commission since 1882.) The levees included in this district consist of the extension of the Arkansas River levees (right bank) below Red Fork, Ark., and the Mississippi River levees proper. The Arkansas River system below Red Fork is 17.5 miles long and is separated from the Mississippi River levee by a gap of 3.5 miles due to the present difficulty of crossing Cypress Creek, a stream of considerable drainage area which flows into the Mississippi River just above Lucca, Ark. (426 R.). The Mississippi River levee begins on comparatively high ground on the north bank of Amos Bayou and extends in a southeasterly direction to the bank of the river about one-half mile below the mouth of Cypress Creek, thence along the right bank to the limit of the third district opposite Warrenton, Miss. (606 R.). The length of the Mississippi River levee is 173.1 miles, of which 83.7 miles are in Arkansas and 89.4 miles in Louisiana. The total length of levee line is 190.6 miles, protecting completely 2,500 square miles, and in addition 500 square miles are protected from ordinary floods.

The following table shows new levees completed covering levees abandoned on account of caving banks:

Locality.	Miles below Cairo.	Beginning station No.—	Length.		Cubic yards abandoned.
			New levee.	Old levee.	
			Feet.	*Feet.*	
Panther Forest	452	1709+50	3,435	2,970	117,500
Grand Lake	508	3671	8,729	7,775	282,000
Mascot	578	3037	1,740	1,900	55,000
Morancy	581	3291	4,574	3,650	88,600
Total			18,478	16,295	543,100

The net change amounts to a lengthening of 2,183 feet, equal to 0.4 mile.

At the beginning of the period the following uncompleted contracts were in force:

Stations.	Miles below Cairo.	Kind of work.	In place May 1, 1907.	To be placed May 1, 1907.	Contractors.
			Cub. yds.	*Cub. yds.*	
783-926	Ark R.	New levee	310,000	211,839	McCadden, Morgan & Co.[a]
629-699	431	do	37,268	92,533	J. B. Lewis.
1720-1790	451	Enlargement		97,000	Lowrance Bros.
3671-3762a	508	New levee	114,198	142,035	J. B. Lewis.
3037-3054a	578	do	34,165	21,398	Robt. Nicholson.

[a] Contract annulled on account of failure of contractors. The work was advertised and relet as hereinafter noted.

On the above contracts there were 564,805 cubic yards remaining to be placed.

Under allotment by the Mississippi River Commission of $225,000 proposals for the following levee work were opened May 11, 1907:

Stations.	Miles below Cairo.	Kind of work.	Estimated contents.	Contract price.	Work awarded to—
			Cubic yds.	*Cents.*	
360-399	427	Enlargement	40,000	33.0	Roach & Stansell.
560-620	429	do	55,000	33.0	Do.
1710-1740	452	New levee	145,000	25.9	W. T. Lowrance.
1790-1854	467	Enlargement	75,000	24.9	Do.
1910-1941	468	do	40,000	28.0	Roach & Stansell.
2050-2155	469	do	100,000		Bids rejected.
Leland Dike:					
60-90	472	New levee	130,000	24.7	Roach & Stansell.
3460-3560	506	Enlargement	120,000		Bids rejected.
3560-3671	508	do	115,000		Do.

There were 485,000 cubic yards contracted for, and bids were rejected on the three sections shown on account of excessive prices. On October 30, 1907, proposals were received for the rejected work, and in addition for a new levee to be constructed on the Arkansas River, stations 635–697, above Red Fork, estimated to require 116,000 cubic yards.

After opening the bids it was found that the funds available were not sufficient to award all of the contracts, hence stations 2050–2155 (469 R.) were omitted.

The contract of McCadden, Morgan & Co., for the Arkansas River extension (stations 783–926) was annulled, and proposals for completion were invited twice before satisfactory prices were obtained. The work was awarded in November, 1907.

There was a total of 959,000 cubic yards of levee work let during the season, which, at the prices bid, will cost approximately $253,861, an average price of 26.49 cents per cubic yard.

The working season was comparatively short on account of the high stage of the river in June and July, 1907, and the continued high water from February 15 to May 1, 1908. While the season lasted, good progress was made on all contracts. The weather conditions were very good and labor was more plentiful than for several seasons past.

All of the work has been completed practically within the contract time limit with exception of one piece, stations 1720–1790 (451 R.). This could not be completed on account of the high stage of the river, which kept the water backed up in the pits so long they could not be drained and put into condition for work before the working season was over. During the period a total of 726,086 cubic yards was placed, leaving a balance of 555,250 cubic yards under contract and remaining to be placed.

Following is a statement showing the uncompleted contracts in force:

Stations.	Miles below Cairo.	Kind of work.	In place May 1, 1908.	Remaining to be placed.	Contractors.
			Cub. yds.	*Cub. yds.*	
562–697	Ark.R.	New levee	54,337	1,228	O. A. Gibson.
778–871	Ark.R.	do		[a] 54,000	Leonard & Rogers.
871–916	Ark.R.	do		[a] 116,000	W. M. Bates.
360–390	427	Enlargement		[a] 40,000	Roach & Stansell.
560–620	429	do		[a] 55,000	Do.
1720–1790	451	do	43,445	53,555	Lowrance Bros.
1790–1854	467	do	47,803	27,197	W. T. Lowrance.
1910–1941	468	do	446	39,554	Roach & Stansell.
3460–3530	506	do		[a] 96,000	O. A. Gibson.
3560–3640	508	do	17,284	74,716	W. M. Bates.
				555,250	

[a] Not commenced.

(For details of contracts, etc., see statement No. 10, hereto appended.)

The various levee boards in the district placed during the period 913,862 cubic yards, and have contracts in force and remaining to complete amounting to 819,379 cubic yards. Their expenditures for levee work amounted to $216,577.72, making an average price of 22.5 cents per cubic yard.

(For details of work done, etc., see statement No. 11, hereto appended.)

SUMMARY OF EARTH IN PLACE.

The following table shows the yardage added to the levee line, the amount lost by levees abandoned, and the net yardage in place at end of the period:

	Arkansas River levees.	Mississippi River levees in—		Total.
		Arkansas.	Louisiana.	
	Cubic yds.	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*
In place May 1, 1907	2,232,119	14,893,347	17,438,242	34,563,708
Added by the United States	120,413	584,275	21,398	726,086
Added by the levee boards	2,796	315,543	595,523	913,862
Total	2,355,328	15,793,165	18,055,163	36,203,656
Lost by levees abandoned		399,500	143,600	543,100
In place May 1, 1908	2,355,328	15,393,665	17,911,563	35,660,556

Since 1882 the United States has constructed in this district 25,878,092 cubic yards, and of the total yardage in the controlling levee line about 60 per cent has been constructed by the United States and 40 per cent by the levee boards.

Following is a revised estimate to complete the levees to Commission grade and section as adopted by the Commission in 1898. The estimate is corrected by allowing for all work completed and under contract.

	Enlargement.	Banquette.	New levees and extensions.	Total.
	Cubic yds.	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*
Arkansas River levees	1,100,000	516,000		1,616,000
Do		84,000	600,000	684,000
Levees in Arkansas	2,183,000	1,725,000	500,000	4,408,000
Levees in Louisiana	2,384,621	2,107,000	500,000	4,991,621
Total	5,667,621	4,432,000	1,600,000	11,699,621

The estimated yardage required to complete the levees to Commission grade and section, including work under contract but not completed, amounts to 12,554,000 cubic yards.

Four hundred and three stations of levee in Arkansas, badly rain and wave washed, were repaired and resodded at a cost of $496. The new end of the Leland dike (472 R.) was partially riprapped with the stone hauled from the old end, 262.5 squares being placed at a cost of $953.12, or $3.62 per square. Weeds were cut on 1,888 stations in Arkansas at a cost of $817.12, and on 1,402 stations in Louisiana at a cost of $845.25, making a total of 3,290 stations cut at an average cost of 51.5 cents per station.

The spur dikes constructed are performing good service, but they should be extended in several localities, and at others new dikes should be constructed. During the year all dikes built and repaired have been given a minimum curvature at the end of 20°, and the extreme end sloped off to about a 10-to-1 slope. A good opportunity of determining to just what extent this construction will resist the action of the current was not had this year, as none of the new dikes were covered with growing sod. It is hoped that after a mat of sod is obtained on the ends it will not be necessary to resort to sacking to prevent current scour on the ends of the dike section, as has been done during each high water in the past.

The usual caving-bank surveys and observations were made. One final location for new levee was made at Red Fork, Ark., on the Arkansas River, and 13.6 miles of continuous levels were run over the top of the levee in Arkansas. A portion of the cost chargeable to surveys was expended by the regular channel-survey party. The total survey expenditures amounted to $1,272.77.

Conditions along reaches where active caving banks exist are as follows:

Lucca to Chicot (425–432 R.).—No appreciable change has been observed during the season opposite the angle at station 483, where the distance remains about the same as for the past two years. The lower part of this reach, below station 620, is entirely covered by new levees under contract by the Tensas Basin levee board. It is expected to complete the new levees this season and to abandon the front line.

Gaines to Panther Forest (430–435 R.).—Caving continues slowly opposite station 1530, and measurements after the present flood recedes may indicate the necessity for a new levee to cover this point this year. The United States constructed a new levee to cover the threatened angle at station 1730 during the period, but caving has continued with renewed activity and the lower end of the new levee just completed will be threatened within about two years. Additional remarks regarding this locality are contained in the current report of channel surveys, to which reference is invited.

Cottonwood, Louisiana (534 R.).—Slow and continued caving along this front may seriously endanger the levee within another year, and a new levee may have to be provided for at this locality this year.

Lower Atherton (559 R.).—It is reported that the lower junction of the new Atherton loop, built in 1905–6, is seriously threatened. Owing to high water since the report was received, it has been impossible to make an examination. It is not thought, however, that the levee will be seriously threatened this year.

Sparta to Duckport (588–590 R.).—There was no caving during the period except at the extreme lower end of the reach. Here the levee was seriously threatened, and the Louisiana board of State engineers has let a contract for a small new levee to cover the threatened point.

In the report above on channel surveys a discussion of the caving banks along the following reaches not mentioned here will be found: For Walkers Bend or Vaucluse (485–490 R.), Matthews Bend or Grand Lake (506–508 R.), and Reid Bedford Bend (603–607 R.).

With the completion of the contracts in force by the United States and the levee boards, practically the entire line will be to a grade and section equivalent to 2 feet or more above the 1903 high water. There are several reaches in Louisiana where the levee stands above the 2-foot grade, but is of deficient section.

After the high water of 1907, a provisional grade was adopted of 3.5 feet to 4 feet above the 1903 high water, with standard section of 8-foot crown and 3 to 1 slopes, with a light topping added to be 1.5 feet above gross grade and having 2-foot crown and 2 to 1 slopes, and after deducting for all work completed and under contract, the following statement shows the estimated enlargement to complete the project as outlined:

Arkansas River levees	cubic yards	940,000
Levees in Arkansas	do	2,153,000
Levees in Louisiana	do	1,484,621
Light topping	do	202,379
Total		4, 000

It will be necessary to undertake the usual repairs, resodding, etc., especially along stretches newly enlarged or completed. The spur levee at Panther Forest (451 R.) should be extended about 300 feet, which would place the end in a much better position to resist scour. It may eventually be necessary to riprap with stone the ends of all the spurs, but for the present it has been decided to make an effort to secure a good mat of sod around the ends, which it is hoped will successfully resist the scour.

The foregoing repair work is estimated to cost as follows:

Repairs to levees on account of rain and wave wash	$3,500
Extension of Panther Forest dike	2,500
Weed cutting in Arkansas and Louisiana	4,000
Total	10,000

In Desha County, Ark., there has been some improvement in the care taken of the levees, but the authorities are still noticeably negligent, particularly north of Arkansas City, where hogs running at large have caused considerable damage. Along the balance of the line abuses where noted are entirely local, and to a large extent have been eliminated altogether. The existence of roads along the base of the levee in many places causes considerable damage to the section and to the immediate base on the land side. Recommendations have been made to the various levee boards to relocate such roads as now follow the base of the levee, and some progress has been made toward having the roads moved.

The field expenditures in this levee district for the year ending May 1, 1908, amounted to $189,263.22, of which 90.5 per cent was for construction, 1.6 per cent for repairs, weed cutting, etc.; 1.3 per cent for high-water expenses, 0.7 per cent for surveys, and 5.9 per cent for engineering.

Work in this levee district was under the immediate supervision of Mr. A. M. Todd, assistant engineer. The foregoing report and appended tables include the essential features of his detailed report, which has been filed at this office. (See maps Nos. 15, 16, 17, and 18, hereto appended.)

HIGH WATER.

A series of three moderate floods originated in the Ohio River between the latter part of February and the middle of April, causing three distinct flood waves between Cairo and Helena, reaching the following crest heights:

At Cairo.		At Helena.	
Date.	Gauge height.	Date.	Gauge height.
	Feet.		*Feet.*
February 26	44.9	March 5	44.1
March 19	45.5	March 26	45.2
April 13	45.3	April 22	44.6

The crests of March 5 and 26 at Helena merged at Arkansas City, and throughout the third district there were two distinct floods, reaching the following heights at the principal gauge stations:

Gauge station.	First crest.		Second crest.		Compared with first crest.
	Date.	Gauge height.	Date.	Gauge height.	
		Feet.		*Feet.*	
Mouth White River	Mar. 26	48.1	Apr. 24	49.0	+0.9
Arkansas City	Mar. 28	48.2	Apr. 25	49.3	+1.1
Greenville	Mar. 29	42.6	Apr. 26	44.0	+1.4
Lake Providence	Mar. 30	42.6	Apr. 27	43.6	+1.0
Vicksburg	Mar. 31	46.9	Apr. 30	47.5	+0.6

The second crest, while lower at Cairo and Helena, was from 0.6 foot to 1.4 feet higher than the first crest throughout this district. This was due to a moderate flood out of the Arkansas and White culminating with the flood out of the Mississippi.

Below is a table showing the second crest compared with the 1903 and 1907 high waters, these being selected for comparison because the 1903 high water is the highest

throughout this district, excepting at Vicksburg, and the 1907 flood is the ıat has been completely confined:

Station.	High water 1908.	High water 1903.	Compared with 1908.	High water 1907.	Compared with 1908.
ıiro	45.3	50.6	+5.3	50.3	+5.0
elena	44.6	51.0	+6.4	50.5	+5.9
:outh White River	49.0	53.7	+4.7	51.9	+2.9
rkansas City	49.3	52.9	+3.6	52.1	+2.8
reenville	44.0	49.1	+5.1	47.3	+3.3
ake Providence	43.6	46.5	+2.9	46.3	+2.7
icksburg	47.5	51.8	+4.3	49.7	+2.2

ıter did not come within 6 feet of the top of the levees at any point. The only er maintenance necessary was a sack revetment along the Arkansas City front to check excessive wave wash; the sacking of the ends of the dikes newly l or constructed at Panther Forest (451 R.), Leland (472 R.), and Grand Lake and a small amount of work at station 3386 (535 L.), to prevent the current he levee slope. As soon as levee work was suspended the force of inspectors ɔn levee construction was assigned to high-water patrol duty and to the main-work. High-water level observations were made along the entire district. nd crest is platted on the profiles shown on the regular annual report district e 1903 high water being also shown for comparison. The limits of the back-tween the Arkansas River and the Mississippi River levees and at the lower e Lower Yazoo levee line were observed, and are shown on the regular over-ɔs accompanying this report. The backwater just overtopped and flowed the sloughs and low places in the Amos Bayou ridge beyond the end of the ıt the streams were not filled up enough to do any damage. There were 54 ıiles overflowed between the two levees.

ing is a statement of high-water expenditures by the United States:

r Yazoo levee district	$2,393.66
r Tensas levee district	2,472.13

the water throughout the district did not attain the high stages of some pre-ars, it remained against the levees for an unusually long period. Seepage ıbout the same area as in 1907. No break occurred in the levees of the district ɔn, and no weakness developed with the exception of sand boils at points e levee material is composed mostly of sand.

llowing table gives the maximum readings for the years 1897 to 1908, inclu-ınged in order of relative heights of floods:

Location.	Height.	Year.	Location.	Height.	Year.
.....	51.6	1897	Helena	47.6	1904
	50.6	1903		47.0	1906
	50.3	1907		46.8	1899
	49.8	1898		45.2	1908
	49.1	1904		41.5	1901
	46.9	1906		39.6	1902
	46.2	1899		38.3	1900
	45.5	1908		37.0	1905
	43.2	1901	Mouth White River	53.7	1903
	42.2	1902		52.4	1897
	39.2	1900		51.9	1907
	38.4	1905		51.1	1898
.....	40.2	1907		49.8	1906
	40.1	1903		49.5	1904
	39.2	1904		49.0	1908
	37.8	1897		48.5	1899
	37.6	1898		44.7	1901
	37.0	1906		43.3	1902
	35.7	1908		41.2	1905
	35.2	1899		40.9	1900
	32.1	1901	Arkansas City	52.9	1903
	30.9	1902		52.1	[illegible]
	29.5	1900		51.9	
	29.0	1905		51.1	
.....	51.1	1897		50.0	
	51.0	1903		49.3	[illegible]
	50.4	1907		49.0	[illegible]
	49.1	1898		48.6	

Location.	Height.	Year.	Location.	Height.
Arkansas City	43.3	1901	Lake Providence	43.7
	41.4	1902		43.6
	39.8	1905		42.5
	39.2	1900		41.7
Greenville	49.1	1903		36.5
	47.3	1907		35.0
	46.8	1897		33.5
	46.2	1898		33.0
	44.9	1906	Vicksburg	52.4
	43.9	1908		51.8
	53.6	1904		49.7
	43.0	1899		49.4
	37.4	1901		47.5
	36.1	1902		47.3
	33.9	1905		47.2
	33.8	1900		46.9
Lake Providence	46.5	1903		44.5
	46.3	1907		41.2
	44.4	1897		38.0
	44.4	1898		37.7

The following table gives the rainfall at Greenville, Miss., from May 1, 1907, to
1, 1908:

Month.	Rainfall.	Mea 22 y
1907.		
May	6.58	
June	1.63	
July	2.22	
August	.62	
September	4.31	
October	3.19	
November	4.82	
December	4.66	
1908.		
January	5.05	
February	11.08	
March	4.77	
April	4.11	
Total	53.04	

Appended to this report are 12 statements of details. Maps numbered from 1 to
and referred to above, are herewith.

Money statement, abstract of contracts in force, and apportionment of cost
deterioration of plant will be forwarded July 1, 1908.

Very respectfully, your obedient servant,

CLARKE S. SMITH,
Captain, Corps of Engine

Col. W. H. BIXBY,
Corps of Engineers, U. S. Army,
President Mississippi River Commission.

[a] Five of which are printed.

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STATEMENT No. 10.—*Levees work in the upper Tensas levee district May 1, 190 May 1, 1908*—Continued.

Stations.	Miles below Cairo.	Total scrapers.	Yards per scraper.	Yards per team.	Price per cubic yard.	Average height.	Average haul.	Kind of
					Cents.	*Feet.*	*Feet.*	
635 to 662	Ark. R	1,412	46	26	23.0	14.2	350	New lev
662 to 697	Ark. R	1,297	42	28	19.0	11.2	250	Do.
778 to 871	Ark. R	(a)	(a)	(a)	29.5	17.5	.....	Do.
871 to 916	Ark. R	(a)	(a)	(a)	26.0	17.0	.....	Do.
360 to 390	427	(a)	(a)	(a)	33.0	22.0	.....	Enlarge
560 to 620	429	(a)	(a)	(a)	33.0	17.0	.....	Do.
620 to 699	431	b 2,349	39	26	24.0	17.0	250	New lev
1720 to 1790	451	788	55	36	34.2	19.0	225	Enlarge
1710 to 1740	452	3,819	38	25	25.9	18.1	350	New lev
1790 to 1854	467	810	59	38	24.9	15.0	175	Enlarge
1910 to 1941	468	19	24	17	28.0	18.5	250	Do.
Leland dike 60 to 90	472	c 1,979	49	25	24.7	15.8	175	New lev
3460 to 3530	506	(a)	(a)	(a)	28.5	18.0	.....	Enlarge
3560 to 3640	508	497	35	24	27.0	17.0	225	Do.
3671 to 3762a	508	2,409	59	28	18.9	15.5	250	New lev
3037 to 3054a	678	636	34	22	23.0	15.5	350	Do.

a Work not commenced.
b One hundred and eighty-two dump wagons used, estimated to equal two scrapers eac
c Eighty-five dump wagons used, estimated to equal two scrapers each.

STATEMENT No. 11.—*Levee construction by the levee boards in Arkansas and Loui from May 1, 1907, to May 1, 1908.*

IN ARKANSAS.

Stations.	Miles below Cairo.	Cubic yards in contract.	Cubic yards placed during year.	Price per cubic yard.	Amount expended.	Kind of
Red Fork:				*Cents.*		
697 to 700	Ark. R.	5,000	2,796	19	$531.24	New lev
Chicot:						
2255 to 2390	484	115,000	19,620	23	4,512.60	Enlarg
3740 to 3758a	508	63,492	54,773	18.9	10,352.10	New lev
4050 to 4209	517	115,000	.....	24.45	.....	Enlarge
Tensas Basin:						
650 to 699	431	261,425	48,629	24	11,870.96	New lev
696 to 740	432	186,500	169,100	18.4	31,114.40	Do.
790 to 910	435	115,000	15,503	27.5	4,263.33	Enlarge
2390 to 2522	484	115,000	7,918	32.7	2,589.19	Do.

IN LOUISIANA.

Fifth Louisiana:						
0 to 256	522	73,000	.....	26.4	.....	Enlarge
2497 to 2753	565	296,243	195,243	26.9	$79,689.36	Do.
2558	565	17,694	17,694	15	2,654.10	Ditch.
4490 to 4540	604	32,000	32,000	30	9,600.00	Enlarge
Board of State engineers:						
0 to 256	522	227,000	40,000	26.4	8,500.00	Do.
1060 to 1136	535	55,443	13,887	17.45	9,652.99	New lev
1190 to 1262	537	55,000	19,107	15.45	2,500.00	Enlarge
1127 to 1190	536	57,379	45,180	15.45	8,865.05	Do.
1539 to 1809	545	276,000	92,790	25	5,100.00	Do.
2274 to 3330	581	139,622	139,622	17.75	24,782.40	New lev

SUMMARY.

	Cubic yards in contract.	Cubic yards placed during year.	T exp
In Arkansas	976,417	318,339	$65
In Louisiana	1,229,381	595,523	151
Grand total	2,205,798	913,862	216

a Part of this levee constructed by the United States. (See statement No 10.)

LONGWOOD, MISS.

July 1, 1907, balance unexpended		$28,043.07
Amounts transferred to other works during fiscal year:		
Plant, third district	$25,000.00	
Stone, third district	3,043.07	
		28,043.07

LAKE PROVIDENCE REACH.

July 1, 1907, balance unexpended	$33,670.28
June 30, 1908, amount expended during fiscal year	26,363.84
July 1, 1908, balance unexpended and available	7,306.44
Amount that can be profitably expended during fiscal year ending June 30, 1910	10,000.00

GENERAL REPAIRS TO EXISTING WORKS.

July 1, 1907, balance unexpended		$30,000.00
Amount allotted from appropriation by act of May 27, 1908		30,000.00
		60,000.00
June 30, 1908, amount expended during fiscal year, account different works, as follows:		
Lake Bolivar front	$1,934.99	
Greenville, Miss	14,632.82	
		16,567.81
July 1, 1908, balance unexpended		43,432.19
July 1, 1908, outstanding liabilities		200.00
July 1, 1908, balance available		43,232.19
Amount that can be profitably expended during fiscal year ending June 30, 1910		90,000.00

FITLERS BEND.

July 1, 1907, balance unexpended	$91,980.71
June 30, 1908, amount expended during fiscal year	52,876.93
July 1, 1908, balance unexpended	39,103.78
July 1, 1908, outstanding liabilities	3,333.33
July 1, 1908, balance available	35,770.45
July 1, 1908, amount covered by uncompleted contract	5,000.00
Amount that can be profitably expended during fiscal year ending June 30, 1910	35,000.00

REID-BEDFORD BEND.

July 1, 1907, balance unexpended	$103,834.13
June 30, 1908, amount expended during fiscal year	11,613.79
July 1, 1908, balance unexpended	92,220.33
July 1, 1908, outstanding liabilities	6,666.67
July 1, 1908, balance available	85,553.66
July 1, 1908, amount covered by uncompleted contracts	12,000.00
Amount that can be profitably expended during fiscal year ending June 30, 1910	35,000.00

LOWER YAZOO LEVEE DISTRICT.

July 1, 1907, balance unexpended	$403,204
Amount allotted from appropriation by act of May 27, 1908	150,000
	553,204
June 30, 1908, amount expended during fiscal year	201,149
July 1, 1908, balance unexpended	352,055
July 1, 1908, outstanding liabilities	200
July 1, 1908, balance available	351,855
July 1, 1908, amount covered by uncompleted contracts	183,300
Amount that can be profitably expended during fiscal year ending June 30, 1910	150,000

UPPER TENSAS LEVEE DISTRICT.

July 1, 1907, balance unexpended	$391,339
Amount allotted from appropriation by act of May 27, 1908	65,000
	456,339
June 30, 1908, amount expended during fiscal year	204,309
July 1, 1908, balance unexpended	252,029
July 1, 1908, outstanding liabilities	300
July 1, 1908, balance available	251,729
July 1, 1908, amount covered by uncompleted contracts	167,400
Amount that can be profitably expended during fiscal year ending June 30, 1910	150,000

Abstract of contracts in force June 30, 1908.

LEVEE WORK.

Name of contractor.	Amount and character of work or material.	Unit price.	Date of— Approval.	Beginning.	Expirati
	Cu. yds.	*Cents.*			
Roach & Stansell	162,000	26.00	Dec. 29, 1905	Aug. 13, 1906	[a]Dec. 31,
J. B. Lewis	95,000	21.00	Oct. 9, 1906	Oct. 9, 1906	[a]Jan. 1,
Do	48,000	28.00	.....do.....	Jan. 1, 1907	[a]Do.
Donovan & Daley	170,000	20.90	.....do.....	May 6, 1907	[a]Do.
J. B. Lewis	167,000	22.00	.....do.....	Dec. 13, 1906	[a]Do.
Roach & Stansell	143,000	24.70	June 6, 1907	June 7, 1907	Jan. 1,
Do	144,000	24.70	.....do.....	June 8, 1907	Do.
Do	[b]108,000	24.70	.....do.....	Dec. 3, 1907	Do.
Do	108,400	22.00	Jan. 4, 1908	Dec. 19, 1907	Do.
Lowrance Brothers	10,000	36.00	Dec. 11, 1907	([c])	[a]Feb. 1,
Gilchrist & Miller	109,000	23.99	Dec. 12, 1907	([c])	Feb. 1,
Do	105,000	21.60	Dec. 16, 1907	([c])	Do.
Lowrance Brothers	97,000	34.20	Nov. 7, 1906	July 5, 1907	[a]Jan. 1,
Roach & Stansell	40,000	33.00	June 6, 1907	([c])	Jan. 1,
Do	55,000	33.00	.....do.....	([c])	Do.
Do	40,000	28.00	.....do.....	Dec. 27, 1907	Do.
W. T. Lowrance	75,000	24.90	June 12, 1907	Dec. 4, 1907	Do.
Leonard & Rogers	54,000	29.50	Nov. 8, 1907	([c])	Do.
W. M. Bates	116,000	26.00	Dec. 10, 1907	([c])	Do.
O. A. Gibson	96,000	28.50	.....do.....	([c])	Do.
W. M. Bates	92,000	27.00	.....do.....	Dec. 18, 1907	Do.

TWELVE MATERIAL BARGES.

Oscar F. Barrett	.....	$4,200	Aug. 6, 1907	Aug. 25, 1907	[a]April 6,

[a] Time limit waived.
[b] Amended by supplemental contract approved Jan. 4, 1908.
[c] Work not commenced.

Abstract of contracts in force June 30, 1908—Continued.

THREE BOILERS FOR GRADER.

Name of contractor.	Amount and character of work or material.	Unit price.	Date of— Approval.	Beginning.	Expiration.
Chas. Hegewald Co		[a]$4,999	Emergency contract.	May 26, 1908	Aug. 24, 1908

TWO MATERIAL BARGES.

Ed. J. Howard		$6,900	Emergency contract.	June 23, 1908	Sept. 19, 1908

BRUSH AND POLES.

G. W. Hunter	*Cords.* 30,000	$1.45	Emergency contract.	(b)	Indefinite.

[a] For all. [b] Work not commenced.

Data of cost of revetment, May 1, 1907, to May 1, 1908.

[Submitted in compliance with resolution of Mississippi River Commission.]

Revetment.	Expended as per financial statement.	Debits to material transferred from reserve, retained percentages, etc.	Credits by material transferred to reserve, etc.
Lake Bolivar front	$40,179.70 [a] 1,934.99	$592.87	$3,401.54
Ashbrook Neck	168.62		168.62
Greenville, Miss	4,231.72 [a] 14,632.82	10,204.55	3,873.00
Lake Providence reach	27,065.23	10,066.56	2,344.18
Fitlers Bend	49,136.34	21,592.15	4,233.56
Reid-Bedford Bend	5,613.46		4,436.29
Upper Tensas levee district, Red Fork, Ark	9,125.14	1,515.43	1,166.40
Total	152,078.02	43,971.56	19,623.59

Revetment.	Cost of work. Construction.	Repairs.	Surveys.	Care, repairs, and deterioration of plant.	Total.
Lake Bolivar front		$39,306.02	$280.36	$6,073.22	$45,659.60
Ashbrook Neck			884.05	7,440.46	8,324.51
Greenville, Miss		25,196.09	1,075.18	11,429.89	37,701.16
Longwood, Miss			361.33	3,041.08	3,402.41
Louisiana Bend			972.17	8,182.19	9,154.36
Lake Providence reach		34,777.61	1,083.44	12,403.41	48,264.46
Fitlers Bend	$66,494.93		171.85	7,727.88	74,394.66
Delta Point			507.29	4,269.57	4,776.86
Reid-Bedford Bend	1,177.17		120.63	1,015.24	2,313.04
Red Fork, Ark	9,474.17		51.77	1,331.47	10,857.41
Total	77,146.27	99,279.72	5,508.07	62,914.41	244,848.47

[a] Amounts chargeable to this work from allotment for "General repairs to existing works."

STATEMENT No. 1.—*Lake Bolivar front.*

Statement of work done.	Cost.	Per cent.
ıares channel mattress, at $7.37+	$23,529.65	39.60—
ıares pocket mattress, at $7.11	8,497.32	14.30—
ıar feet bank graded (hydraulic), at $1.242	2,461.06	4.14+
ıar feet slope dressed, at $0.285—	427.12	.72—
ıuares bank paved, at $7.287	12,524.58	21.08—
: yards stone loaded, at $0.556—	513.01	.86+
ı brush cut and loaded, at $0.905+	278.02	.47—
towing (Coppee), at $55.30	4,977.29	8.38—
towing (Hider), at $59.76	1,135.47	1.92—
ıpairs to old work	315.92	.53+
y purchased	1,470.68	2.47±
neous charges	668.74	1.12+
ıion	1,974.38	3.32+
r office charges	653.23	1.09+
ıtal	59,426.47	100.00

STATEMENT No. 2.—*Greenville harbor.*

Statement of work done.	Cost.	Per cent.
res of channel mattress, at $6.767+	$6,243.69	24.78+
res of pocket mattress, at $6.876+	6,855.66	27.21—
r feet of hand grading, at $1.273+	751.28	2.98+
res of hand grading, at $0.835+	810.24	3.22—
res bank paved (riprap), at $7.982+	2,274.95	9.03—
res bank paved riprap, at $3.862—	3,340.56	13.25+
res bank paved (spalls), at $2.544+	623.35	2.47+
r feet ditching, at $0.12+	72.08	.29—
ı yards stone loaded, at $0.641+	557.39	2.21+
ıpairs	500.42	1.99—
	1,537.34	6.10+
'ker	457.68	1.82—
neous charges	173.77	.69—
y purchased	17.00	.07—
r office charges	350.00	1.39—
ıion	630.68	2.50+
ıtal	25,196.09	100.00

STATEMENT No. 3.—*Lake Providence.*

Statement of work done.	Cost.	Per cent.
ıares of channel mattress, at $7.861	$16,980.30	48.83
es of pocket mattress, at $6.704	489.42	10.28
res of pocket mattress, at $6.612	3,087.30	
r feet hydraulic grading, at $1.648	453.34	1.30
ɜar feet hand grading, at $1.684	1,684.99	5.14
r feet hand grading, at $0.7928	103.06	
res of bank paved, at $6.201	3,361.11	11.14
es of bank paved, at $5.705	513.45	
ı brush cut and loaded, at $1.88	433.25	1.25
steamer Coppee	2,962.71	9.90
steamer Hider	480.87	
ıpairs to old work	336.95	.97
on, steamer Control	166.72	.48
y purchased	1,116.40	3.21
neous charges	852.52	2.45
r office charges	397.05	1.14
ıion	1,278.62	3.68
stone	79.55	.23
ıtal	34,777.61	100.00

the plant was available for work in Kempe Bend the river was at too permit of a junction of the pavement and mattress work near mean lo was therefore decided to place connecting mats from near section A, w was left off the year before, downstream to near the mouth of the big di and to carry the mats up on the graded bank to about a 10-foot stage on gauge; to repair breaks in revetment at upper end and between sections fill hole and pave upper bank on point between sections 2 and 3.

Operations in the bend were commenced on January 20, 1908, and pleted on February 19. On the completion of the Kempe work the p ferred to laying-up quarters in Giles Bend.

Constructing mats.—The mats for this work were constructed at Rac 10 miles below Vicksburg. Work was commenced January 10, when t *Delta* arrived from Bruinsburg bar. Details of cost and construction w report on Giles Bend, Natchez, and Vidalia harbors. There were const work 276,000 square feet, valued at $10,156.80.

Towing mats.—The mats were towed about 60 miles and the cost w

Tug *Marengo*, 12 days at $24	
Steamer *Tensas*, 11 days at $23	
Total	
Square feet towed	
Cost per square foot for towing	

Sinking mats.—It required 48,000 square feet of mats to repair the l sections 23 and 24; 24,000 square feet to repair small breaks between 7, and 204,000 square feet of connecting mats, covering 2,300 feet of sections A and 12. The rock used for ballast was stored on the bank the cost of towing and unloading is added to the first cost of the rock. is the detailed cost of this work:

Steamers and tugs	
Lumber, wire, nails, etc	
1,662 tons of rock, at $2.36	
Miscellaneous	
Provisions	
Pay rolls	
Total	
Square feet sunk	

not be paved on account of sudden rise of the river. The following is the cost in detail:

116 tons spalls	$273.76
74 tons of rock	174.64
Provisions	51.25
Pay rolls	215.60
Total	715.25

Drainage.—The ditches for draining borrow pits behind the revetments were deepened and some new ones opened, at a cost of $306.48.

Installation.—The installation expenses for this work amounted to $960. This item includes proportion of transferring fleet from New Orleans to the works above Natchez.

Surveys.—The usual annual hydrographic survey of the bend was made, and the field notes have been reduced and platted. No changes of importance are noted, except those already mentioned, since previous survey. Cost, $501.18.

The total cost of the work in Kempe Bend from May 1, 1907, to May 1, 1908, was $21,675.97, distributed as follows:

Constructing mattresses	$10,156.80
Towing mattresses	541.00
Sinking mattresses	7,166.25
Grading and paving	715.25
Drainage	306.48
Installation	960.00
Surveys	501.18
Care of plant	411.79
New plant	110.90
Miscellaneous	2.76
Office and administration	803.56
Total	21,675.97

At the close of the season's work there was on the bank at Kempe for this work material for future construction valued at $18,000. The repairs and maintenance of revetment cost $6,706 and improvement $14,969.97. The revetment in this bend now has a length of 10,871 linear feet, no extension having been made during the past season.

Map is herewith (Pl. II) showing the work done during the years 1907 and 1908 and the contours of the survey completed in November, 1906. The field work was in charge of Assistant Engineer E. B. Geddes, assisted by Junior Engineer J. H. Lewis and Overseer J. R. Allen.

The amount expended from June 30, 1907, to June 30, 1908, is $15,686.95, distributed as follows:

Office expenses (main office)		$71.42
Other administrative expenses		985.70
Construction (hired labor):		
Materials	$1,500.11	
Wages	9,294.62	
Subsistence	2,580.91	
		13,375.64
Surveys		501.18
Care of plant		633.40
New plant		110.90
Miscellaneous		8.71
Total		15,686.95

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $471.20, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant for care and repair of plant during the lay-off season and at the engineer depot was $35,212.48, of which the pro rata share chargeable to the above work is estimated to be $3,055.42.

Abstract of appropriations.

KEMPE BEND REVETMENT.

Act of Congress.	Allotted.	Amount.
Mar. 3, 1899 (sundry civil)	Mar. 13, 1900	$180,000
June 6, 1900 (sundry civil)	July 14, 1900	150,000
June 13, 1902 (river and harbor)	July 12, 1902	60,000
Mar. 3, 1903 (sundry civil)	July 21, 1903	64,000
Mar. 3, 1903 (sundry civil)	By transfer.	30,000
Apr. 28, 1904 (sundry civil)	Apr. 1, 1904	80,000
Mar. 3, 1905 (river and harbor)	Apr. 26, 1905	90,000
June 30, 1906 (sundry civil)	June 28, 1906	50,000
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	12,000
Total		716,000

3. HARBORS OF NATCHEZ AND VIDALIA.

For history of this work, project, and details of its execution, see current summary and previous annual reports of the Chief of Engineers.

The harbors at Natchez and Vidalia include improvement works in Giles Bend and along Natchez front.

At the beginning of the year there were in place in Giles Bend 19,208 linear feet of revetment of various kinds in two detached pieces—upper, 8,192 feet, and lower, 11,016 feet. The unprotected interval between the upper and lower revetments was about 3,700 feet. No work had been done on the Natchez front.

Giles Bend.—Upon the decline of the high water of 1907, it was discovered that a pocket about 600 feet long had caved between sections 28 and 30, destroying the upper bank revetment and the inshore edge of the channel mattress.

Another small cave occurred at the extreme lower end of the lower revetment, destroying some pavement and the inshore end of the channel mat near the outer end of the levee.

The approved project for this work provided for extending the lower revetment upstream about 1,000 feet, and upper revetment downstream about 1,000 feet; for making repairs and extending pavement around spurs; for repairing caves in lower revetment and for paving about 1,000 linear feet at salient points along the 4,363 feet feet of unprotected upper bank of the lower revetment.

At the beginning of the season all the plant belonging to the up-river works was at engineer depot, New Orleans, La.

The first tow, consisting of the quarterboat *Delta* and 4 empty barges, left New Orleans in two of the tug *Morganza* on July 23, and arrived at Giles Bend on July 31. The second tow, consisting of grader *No. 5* and 2 barges, arrived in Giles Bend on August 16. On August 1 the *Delta* was put in commission and a small force organized to cut timber and clear the bank along the unprotected stretch in Giles Bend. This work was completed on August 20 and the force transferred to other work.

The grading of the upper bank, where it was proposed to lay pavement, was begun on September 24 and completed on September 30.

The rock for this work was loaded from the bank in Giles and Kempe bends, and delivered on contract at Vidalia. The rock delivered at Vidalia cost $2.75½ per ton on United States barges. The loading of rock and spalls was begun at Kempe Bend on November 22. The sinking of the mats was commenced on December 3, 1907, and all operations suspended on January 15, 1908.

During the season's work in Giles Bend the lower revetment was extended upstream 975 feet and downstream 145 feet; the break in the revetment between sections 28 and 30 mattressed about 150 feet wide for 600 feet; about 135,000 square feet of bank graded and 88,765 paved, and the bank cleared of trees and logs for 3,700 feet along the unprotected bank between the revetments. Owing to more work being required to close breaks in revetment than was contemplated at the beginning of the season, and the plant being needed on other work, the extension of the upper revetment downstream and the repairs contemplated around the spurs could not be done.

Constructing mattresses.—The mats for this and other works this season were constructed on four willow bars, viz, Big Black Island, where 597,000 square feet were constructed; Quitman, where 402,000 square feet were constructed; Bruinsburg, where 292,720 square feet were constructed; and Race Horse Island, where 366,000 square feet were constructed, 126,000 square feet being for New Orleans Harbor. Of the 126,000 square feet constructed for New Orleans Harbor, 36,000 square feet were built at Quitman for Natchez front, but broke loose at Natchez and had to be sunk

in New Orleans Harbor. The type of mattress used in Kempe, Natchez and Vidalia and New Orleans Harbor revetments was the same, and the cost of building is consolidated, each work being charged with its pro rata of the total amount constructed. The framed mattress was used on all the works and the sections were constructed on ways built on the willow bars. The construction of mattresses for Natchez front was commenced at Big Black Island on August 22. After using up all the available willows on this bar the force was moved to Quitman on October 14. The willows on this bar were exhausted by November 26, and the force moved to Bruinsburg. A rise in the river made it necessary to move to a higher bar and the force was again transferred to Race Horse Island on January 10. The construction of mattresses was continued on this bar until February 20, 1908, when the river had reached so high a stage that work had to be closed down for the season. The following is the detailed cost of the work:

Steamers and tugs	$2,452.00
[illegible]4,000 feet B. M. miscellaneous lumber	196.00
[illegible]60,952 feet B. M. 2 by 4 inch lumber	8,247.23
[illegible]63,309 feet B. M. 3 by 6 inch lumber	4,255.41
[illegible]22,500 pounds 9-inch nails	494.17
[illegible]44,900 pounds 6-inch nails	985.51
[illegible]11,700 pounds 4-inch nails	264.73
[illegible]4,600 pounds No. 12 galvanized wire	144.04
[illegible]104,000 treenails	295.50
[illegible]1.93 acres of willows	392.91
Miscellaneous	499.03
Teams	10,443.28
Provisions	5,857.52
Pay rolls	26,476.76
Total	61,004.09
Total square feet built	1,657,720
Cost per square foot to build	$0.03680

Of this total, 448,720 square feet were used in Giles Bend, valued at $16,512.89.

Towing mattresses.—The mattresses for this work were constructed on Quitman and Bruinsburg bars, 5 miles and 40 miles, respectively, above the work, and the cost of towing was as follows:

Steamer *Tensas*, 15 days, at $23	$345.00
Tug *Marengo*, 3 days, at $24	72.00
Tug *Tunica*, 6 days, at $26	156.00
Total	573.00
Total square feet of mattress towed	448,720
Cost per square foot for towing	$0.00128

Sinking mattresses.—To extend the lower revetment upstream 975 feet required [illegible]6,330 square feet of mats; to extend the lower revetment 145 feet required 46,500 square feet; 36,000 square feet were required for connecting mats between sections [illegible] and 24, and 109,890 square feet were required for repairing break between sections [illegible] and 30. The mats to extend the revetment were sunk in strips 300 feet wide. The high cost of the rock was the main factor in increasing the cost of sinking over previous years. The following is the detailed cost of the sinking:

Steamers and tugs	$726.00
Lumber, wire, nails, etc	175.00
[illegible]2,747 tons of rock, at $2.86	7,856.42
Miscellaneous	51.38
Provisions	1,026.73
Pay rolls	4,082.52
Total	13,918.05
Total square feet of mattress sunk	448,720
Cost per square foot to sink	$0.03101

Cost of mattresses in place:

Constructin[illegible] mat[illegible]sses	$0.03680
Towing matt[illegible]	0.00128
Sinking matt[illegible]	0.03101
Total cost [illegible] are foot in place	0.[illegible]

Grading.—There were 2,047 linear feet of bank graded with hydraulic grader a 22,857 square feet graded by hand. The cost was:

Grading with shovels	$300.
Grading with hydraulic grader	1,619.
Total	1,919.

Paving.—There were paved with rock between sections 22 and 24, 46,706 square fe covering 600 linear feet of bank; 22,857 square feet with rock between sections 27 a 30, and 20,202 square feet between sections 42 and 43 with rock and spalls. The c was as follows:

Steamers and tugs	$43.1
2,044 tons of rock, at $2.86	5,845.1
255 tons of spalls, at $2.86	729.1
Miscellaneous	25.6
Provisions	241.9
Pay rolls	894.2
Total	7,784.9
Total square feet paved	89,7
Cost per square foot for paving	$0.086

Clearing.—The timber along the unprotected part of the bend was cut back fro 100 to 200 feet wide, and the bank between sections 22 and 24 cleared of trees and dri at a cost of $791.04.

Installation.—The installation expenses for this work amounted to $1,567.15.

Surveys.—The survey completed shows rapid scour along the unprotected ba between the revetments and behind the mattress work in places where the upper ba has not been paved. There has been but little change in the channel outside a over the mattresses in the last year except where the caves occurred along the low revetment. Cost, $1,092.74.

The total cost of the work in Giles Bend from May 1, 1907, to May 1, 1908, w $47,319.33, distributed as follows:

Constructing mattresses	$16,512.
Towing mattresses	573.
Sinking mattresses	13,918.
Grading	1,919.
Paving	7,784.
Clearing	791.
Installation	1,567.
Surveys	1,092.
Miscellaneous	6.
Care of plant	1,012.
New plant	95.
Office and administration	2,045.
Total	47,319.

At the close of the season's work there was on hand material available for fu construction valued at $3,000.

The repairs and maintenance of revetment cost $12,560 and the improvements $34,759.33. The subaqueous revetment was extended during the year 1,120 feet a now has a length of 20,328 feet in two detached pieces, the upper being 8,192 feet and the lower 12,136 feet long. The unprotected interval between has a leng about 2,600 feet.

Map is herewith (Plate III), showing the work of this and previous years a soundings of the survey completed in October, 1906. The field work was in c of Assistant Engineer E. B. Geddes, assisted by Junior Engineer J. H. Lewis, Overseer J. R. Allen.

[Giles Bend.]

ie amount expended from June 30, 1907, to June 30, 1908, is $49,848.94, distributed llows:

e expenses (main office)		$816.13
r administrative expenses		1,553.95
truction (hired labor):		
Materials	$17,550.60	
Wages	20,210.19	
Subsistence	7,209.81	
		44,970.60
eys		1,092.74
of plant		1,307.68
plant		95.74
allaneous		12.10
Total		49,848.94

compliance with resolution of the Commission adopted April 9, 1906, there should ded to the above total cost for the year $2,644.98, for use and deterioration of , being a charge of 3 per cent per annum for use of plant and 4 per cent per n for deterioration. During the year the total amount charged to the allotment ant for care and repair of plant during the lay-off season and at the engineer was $35,212.48, of which the pro rata share chargeable to the above work is ted to be $6,258.04.

Faz front.—The project for the expenditure of $100,000 allotted from the river rbor act of March 2, 1907, for this work provided for revetting about 1,500 feet in f the waterworks and about 1,500 feet higher up in the bend above Learned's Bl.

k on this project was commenced on August 22, when the quarter boat *Delta* was l to Big Black Island. The mats were built on this and Quitman bar. Rock was l from the reserve piles in Kempe Bend and Giles Bend for sinking mattresses, as livery of rock on contract at Vidalia did not begin until the mattress work was completed. Most of the rock used for paving was delivered at Vidalia and cost per ton loaded on barges.

r loading about 3,000 tons of rock at Kempe Bend the plant was moved tchez front on September 27, and the first sinking made October 2. The lower n in front of the waterworks was completed on October 23. The force was then arred to Giles Bend and some additional rock loaded for the work. The force en returned to Natchez, and the sinking above Learned's sawmill continued November 16, when this part of the work was completed.

grader was moved to Natchez on November 1. About 600 linear feet of the bank was graded along the upper end of the lower stretch and all the upper h. A force was retained until January 19, grading and paving the upper bank, all work contemplated at this locality was completed.

result of the season's work along the Natchez front, there were mattressed with 300 feet wide 1,400 feet in front of the city waterworks plant, and 1,150 feet r up in the bend, where caving has been most active; 600 linear feet of the lower ment was graded and 575 linear feet paved with rock, and 1,194 linear feet d and 325 linear feet paved with rock and spalls above Learned's sawmill. The end of the lower revetment and the upper end of the upper revetment are pro- l to some extent by projecting points, and the upper bank is a hard, tenacious not easily washed by the current. For this reason it was not thought necessary ve the upper bank above low water along this part of the work.

account of the rugged nature of the bottom of the river in front of Natchez, precautions were taken to strengthen the mats, and the outside pockets were ened to prevent the rock from rolling off on some of the steep slopes. A lap of 10 was allowed to make sure of a junction between the different sinkings.

nstructing mattresses.—There were constructed for this work 807,000 square feet ts, valued at $29,697.60

wing mattresses.—The cost of towing mats from Big Black Island and Quitman was lows:

ner *Tensas*, 22 days, at $23	$506
Marengo, 20 days, at $24	480
Morganza, 10 days, at $26	260
Total	$1,246
e feet towed	807,000
per square foot	$0.00154

Sinking mattresses.—The lower stretch in front of the waterworks required 432,000 square feet and the upper stretch 375,000 square feet. Of the 375,000 square feet 15,000 square feet were connecting mats used for making the junction between the channel mats and the pavement.

The following is the detailed cost:

Steamers and tugs	$1,142.00
Lumber, wire, nails, etc	272.50
5,256 tons of rock, at $2.75½	14,480.28
Miscellaneous	50.49
Provisions	2,019.37
Pay rolls	8,195.69
Total	26,160.33
Square feet sunk	807,000
Cost per square foot to sink	$0.03241
Cost of mattresses in place:	
Constructing mattresses	$0.03680
Towing mattresses	.00154
Sinking mattresses	.03241
Total cost per square foot in place	.07075

Grading.—The 600 linear feet graded along the lower stretch was partly graded by hand and partly by hydraulic grader. Owing to the sandy nature of the lower slope near the water the grading needed had to be done by hand. The steep slope at the top was cut off later with the grader when the water reached a high enough stage to protect the lower slope from washing. With the exception of about 50 feet the upper bank was entirely graded with "Grader No. 5." The cost of the grading was as follows:

Grading with shovels	$278.73
Grading with hydraulic grader	2,772.23
Total	3,050.96
Linear feet graded	1,794
Cost per square foot for grading	$1.70

Paving.—The 575 linear feet paved along the lower stretch was carried up to about 36 feet on the Natchez gauge. The 325 linear feet paved at the lower end of the upper revetment was carried up to 40 or 42 feet on the Natchez gauge. The following is the detailed cost:

Steamers and tugs	$146.00
2,194 tons of rock, at $2.75½	6,044.47
357 tons of spalls, at $2.75½	983.53
Miscellaneous	42.94
Provisions	362.11
Pay rolls	1,574.25
Total	9,153.30
Square feet paved	88,930
Cost per square foot for paving	$0.10292

Installation.—The installation expenses for this work amounted to $2,600.05.

Surveys.—The hydrographic survey of the river along the Natchez and Vidalia fronts has been completed and except where the work has been done the past season no radical changes since the survey made the preceding year are noted. Cost, $847.94.

The total cost of the work along the Natchez front from May 1, 1907, to May 1, 1908, was $77,545.69, distributed as follows:

Constructing mattresses	$29,697.60
Towing mattresses	1,246.00
Sinking mattresses	26,160.33
Grading	3,050.96
Paving	9,153.30
Installation	2,600.05
Surveys	847.94
Care of plant	703.78
New plant	1,989.40

Miscellaneous	$30.65
Office and administration	2,065.68
Total	77,545.69

At the close of the season's work, there was on hand material available for future construction valued at $7,000.

The revetment along the Natchez front covers a total length of 2,550 feet of bank in two detached pieces, the lower piece being 1,400 feet and the upper 1,150 feet. There is a gap of 2,000 feet between the two pieces, but no changes of importance in the bank line or in the channel have occurred in several years along this part of the front and no work is considered necessary.

Map is herewith (Plate XII) showing the work of the season, and the soundings of the survey completed in October, 1907. The field work was in charge of Assistant Engineer E. B. Geddes, assisted by Junior Engineer J. H. Lewis and Overseer J. R. Allen.

[Natchez front.]

The amount expended from June 30, 1907, to June 30, 1908, is $85,599.60, distributed as follows:

Office expenses (main office)		$1,268.20
Other administrative expenses		840.48
Construction (hired labor):		
Materials	$40,808.91	
Wages	30,968.39	
Subsistence	7,980.35	
		79,757.65
Surveys		847.94
Care of plant		865.28
New plant		1,989.40
Miscellaneous		30.65
Total		85,599.60

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $3,882.50, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant for care and repair of plant during the lay-off season and at the engineer depot, was $35,212.48, of which the pro rata share chargeable to the above work is estimated to be $10,925.64.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
Harbors of Natchez and Vidalia:		
June 16, 1880 (sundry civil)		$40,000.00
Mar. 3, 1881 (river and harbor)		50,000.00
July 13, 1892 (river and harbor)		80,000.00
Aug. 18, 1894 (sundry civil)		80,000.00
June 3, 1896 (river and harbor)	June 27, 1896	64,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	50,000.00
June 13, 1902 (river and harbor)	July 12, 1902	60,000.00
Mar. 3, 1903 (sundry civil)	July 21, 1903	12,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	40,000.00
June 30, 1906 (sundry civil)	June 28, 1906	50,000.00
Mar. 2, 1907 (river and harbor)	July 12, 1907	
For Giles Bend ($75,000)		175,000.00
For Natchez front ($100,000)		
Received from sales, blueprints		2.10
		701,002.10
Prevention of cut-off at Giles Bend, La.:		
June 4, 1897 (sundry civil)	July 10, 1897	a 110,000.00
June 6, 1900 (sundry civil)	July 14, 1900	150,000.00
		260,000.00
Emergencies in river and harbor works—allotment for "Mississippi River at Giles Bend:"		
Apr. 28, 1904 (sundry civil)	July 6, 1904	40,000.00
Grand total		1,001,002.10

a Original allotment, $150,000; $40,000 transferred to harbor at New Orleans.

4. IMPROVING ATCHAFALAYA AND RED RIVERS, LOUISIANA.

For history of this work, project, and details of execution, see current summary and previous reports of the Chief of Engineers.

The work contemplated for the past season was to repair and maintain the dredge *The Ram;* to repair Sill Dam No. 3, in the Atchafalaya River, and to do such dredging as might be necessary to maintain low-water navigation between the Mississippi, Red, and Atchafalaya rivers, through lower Old River.

On September 6, with the Red River Landing and Barbres gauges reading respectively 18.7 and 17.5, an inspection of the channel through lower Old River was made and a least depth of 8 feet was found over the bar at the Mississippi entrance. As no rise of the river was in sight, it was decided to put the hydraulic dredge *The Ram* in commission and do such dredging as might be necessary to maintain low-water navigation. *The Ram*, with fuel barge in tow, left the engineer depot at New Orleans on September 14, and arrived at the mouth of Old River on September 18. The necessary fastenings were placed, the proposed channel ranged out and dredging commenced on September 24, on which date the Red River Landing and Barbres guages read respectively 13.0 and 12.0. Dredging continued without incident until October 10, by which time a cut 1,250 feet long and averaging 100 feet wide at the bottom had been made from deep water in the Mississippi to deep water in Old River. With the Red River Landing gauge reading 12.1 and the Barbres reading 10.5, the least depth in the dredged channel was 15 feet. As the probabilities were that the channel would scour as the river fell and the prospects of a zero stage were remote, it was decided to return *The Ram* to the engineer depot at New Orleans where she was put out of commission on October 14.

On November 12 the Red River Landing gauge had fallen to 7.8 and the Barbres to 6.7, but navigation through the dredged channel and Old River was not obstructed, a sufficient depth being found at all times. During the year covered by this report the current in Old River has flowed uninterruptedly from the Mississippi toward the Atchafalaya. No change in the direction of current has occurred since June 15, 1906, a period of about two years, which is believed to be the longest period on record for this condition to be maintained.

The annual survey over the site of the sill dams in the Atchafalaya has been made. The results indicate a slight scour above, between, and below the sill dams, but this scour is not alarming or more than was to be expected as a consequence of a prolonged high stage of the river, which remained above 30 feet on the Barbres gauge from December 3, 1906, until July 24, 1907, a period of 235 days. As extreme low water is required to make the repairs to the east shore end of Sill Dam No. 3 in a proper and economical manner, it has been impracticable to do this work up to the present time.

The amount expended from June 30, 1907, to June 30, 1908, is $3,106.88, distributed as follows:

Office expenses (main office)		$20.16
Other administrative expenses		20.10
Dredging Old River:		
Materials	$701.30	
Wages	1,158.04	
Subsistence	322.90	
		2,182.24
Surveys		298.42
Care of plant		581.36
New plant		4.60
Total		3,106.88

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $276.56 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
South of Red River, Louisiana:		
June 18, 1878 (river and harbor)		$150,000.00
Mar. 3, 1879 (sundry civil)		40,000.00
July 5, 1884 (river and harbor)	Aug. 5, 1884	[a] 11,390.00
Do	By transfer	10,500.00
Do	do	1,400.00
Do	Aug. 19, 1884	15,000.00
		228,290.00
Rectification of Red and Atchafalaya rivers:		
Aug. 5, 1886 (river and harbor)		187,500.00
Aug. 11, 1888 (river and harbor)		250,000.00
Sept. 19, 1890 (river and harbor)	Oct 15, 1890	[b] 217,000.00
Do	By transfer	3,000.00
July 13, 1892 (river and harbor)		80,000.00
Aug. 18, 1894 (sundry civil)		[c] 70,000.00
June 3, 1896 (river and harbor)	June 27, 1896	40,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	25,000.00
June 13, 1902 (river and harbor)	July 12, 1902	15,000.00
Do	Oct 17, 1904	1,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	24,000.00
Settlement by Navy Department	Feb. 6, 1907	8,666.42
		921,166.42
Grand total		1,149,456.42

[a] Original allotment, $12,290; $900 transferred to harbor at New Orleans.
[b] Original allotment, $225,000; $8,000 transferred to harbor at New Orleans.
[c] $2,500 expended improving Bayou des Glaises.

5. NEW ORLEANS HARBOR.

For history of this work, project, and details of its execution, see current summary and previous annual reports of the Chief of Engineers.

For general map showing location of works of improvement in New Orleans Harbor, see Plate V, Annual Report for 1905, opposite page 280, Supplement.

The aggregate length of bank protected in whole or in part was 27,280 linear feet, all of the work being in good condition as far as was known.

Operations contemplated during the past season were to revet about 2,650 linear feet of bank near Amesville in the Greenville Bend, to close a gap in the continuous revetment in the Carrollton Bend, and to make minor repairs and maintain existing work. This plan was modified to the extent of resuming bank protection work in the Third District Reach, where operations had been suspended since 1897.

Active operations of the season just closed commenced on September 17, when the quarter boat *New Orleans*, lumber barge, and other necessary plant left the engineer depot at New Orleans and was towed to Esperance bar, about 16 miles below Natchez, arriving on September 22. The cutting of brush and construction of ways was commenced at once. The first mattress was launched October 10. By the end of October all available brush on Esperance bar had been used, and the plant transferred to Bougere bar, 37 miles below Natchez, where construction of mattresses was continued. By December 15 the brush on this bar was exhausted and the force was transferred to Lum's bar, near Fort Adams, where operations were continued until January 30. On this date the partial overflow of this bar cut off the supply of brush and compelled a suspension of mattress construction at this locality. The force was laid off and the quarter boat returned to New Orleans, arriving February 4. The first tow of mattresses arrived in New Orleans on November 12 and the last on February 29. On October 25 a small force was organized in New Orleans to unload rock from barges to the bank, to make room for additional rock purchased from vessels arriving in ballast. No quarter boat being available at the time for the sinking force at Amesville revetment, construction of temporary quarters on the bank was commenced on November 11. They were completed, equipped, and occupied by an organized force on November 29. The sinking plant was strung out on December 3 and the first mattress sunk at Amesville on December 5. The last mattress was sunk at Amesville on January 4. No mattresses being on hand, the laborers were laid off and operations, except some necessary upper bank grading and paving, suspended until February 18, when sufficient mattresses having been towed down, the plant was moved to the third district

reach. The quarter boat *New Orleans*, which had meanwhile returned from mattress construction, was used to accommodate the sinking force. On February 21 the first mattress was sunk in the third district reach and the last on March 14, completing work for the season. All plant was returned to the engineer depot and put out of commission on March 17.

Mattress construction.—The prolonged high stage of the river and the difficulty of securing a willow bar delayed the commencement of work. On September 22 the quarter boat *New Orleans* and other plant arrived at Esperance bar, 16 miles below Natchez. The prolonged overflow had caused a deposit several feet deep over the bar, and it was slow in drying out. As a consequence roads were bad, and the prevalence of glanders in the vicinity made it difficult to secure sufficient teams. The first mattress was launched on October 10, and after constructing 150,000 square feet the bar had to be abandoned because teams could no longer haul over the soft ground. On October 30 the plant was moved to Bougere bar and the cutting of willow brush and construction of mattresses continued. By hauling brush a long distance and using cottonwood saplings, tree tops, etc., it was possible to build 300,000 square feet of mattress at Bougere. On December 15 the force was moved to Lum's bar, but the holiday season was at hand and heavy rains occurred. As a result but little in the way of actual construction could be accomplished until January 3, when the building of mattresses was resumed. This hiatus was the cause of the temporary suspension of sinking operations in New Orleans Harbor. On January 3 the river had commenced to rise, but construction of mattresses was continued until January 30, when the continued rise of the river partially overflowed the bar and compelled a closing down of the work after 180,000 square feet of mattress had been built. The quarter boat *New Orleans* was engaged on mattress construction, excluding Sundays and holidays, for 110 days, of which 16¾ days were lost on account of rain and other unpreventable causes. Net working days, 93¼, during which a total of 630,000 square feet of mattress was built, the itemized field cost being as follows:

80,000 feet B. M. 3 by 6 inch lumber	$1,502.75
209,000 feet B. M. 2 by 4 inch lumber	3,600.70
18,700 feet B. M. miscellaneous lumber	370.00
8,900 pounds 9-inch steel-wire nails	236.35
16,500 pounds 6-inch steel-wire nails	371.25
6,100 pounds 4-inch steel-wire nails	137.25
4,160 pounds No. 10 galvanized wire	104.00
6,700 cords willow brush	10,186.80
Tree nails	161.50
Service of tugs	1,642.75
Miscellaneous	112.20
Provisions	1,840.44
Pay rolls	8,905.00
Total	29,171.06

When mattress construction was suspended at Lum's bar, arrangements were made to have the force that was building mattresses for Kempe Bend construct for New Orleans Harbor also. This force was located on a high bar about 6 miles below Vicksburg, Miss., but even this bar was overflowed on February 19, after 90,000 square feet of mattress had been built. On November 11, 36,000 square feet of mattress which had been constructed for Natchez harbor broke adrift from its moorings in Giles Bend, floated down the river, and was caught and landed at Bougere. These two areas of mattress, added to the 630,000 square feet built by the force on the quarter boat *New Orleans*, made a total of 756,000 square feet built for and used in New Orleans Harbor, as follows:

630,000 square feet, built on bars below Natchez	$29,171.08
126,000 square feet, built on bars above Natchez	5,216.47
756,000 Total	34,387.55

Willow brush.—Owing to the demand for material incident to the construction of the jetties at Southwest Pass, over a quarter of a million cords of willow brush have been cut from bars in the lower Mississippi River since 1905. As a result there are practically no bars where any large quantity of brush can be obtained even with a long haul. Added to this was the boggy condition of the bars which had been overflowed continuously for 8½ months and had not had time to dry out to any considerable extent during the comparatively short season of low water. Frequent changes of location,

ding roads, light loads, and long hauls made the cost of brush unusually high. In il as follows:

lding roads, cutting and piling willows	$6,709.32
ling	3,157.57
rilege of cutting	320.00
Total	10,186.89

s 6,700 cords of brush were required, the cost per cord delivered at the ways was 2.

Vays.—Four sets of mattress ways were built. The first set, at Esperance bar, had e dismantled after building only 150,000 square feet of mattress. A second set of s was built at Bougere, and from these an output of 300,000 square feet of mattress obtained. A rapid rise of the river prevented much service being rendered by third set, at Lum's bar, and operations on the fourth set were limited to 105,000 are feet, when further work was prevented by the overflow of the bar.

total cost of four sets of ways was	$1,402.92
rage cost, one set of ways	350.73

owing.—As has been customary, the cost of towing lumber and other materials to work has been added to and is included in the cost of such materials delivered at tination. The tugs *Morganza* and *Tunica* towed all of the mattresses from the e of construction to New Orleans, as follows:

	Miles.
00 square feet from Race Horse Island to New Orleans	361
,000 square feet from Esperance bar to New Orleans	247
,000 square feet from Bougere bar to New Orleans	227
,000 square feet from Lum's bar to New Orleans	207

he cost of towing mattresses as above was:

Morganza, 45 days, at $29.50	$1,327.50
Tunica, 37 days, at $28.65	1,060.05
Total	2,387.55

inking.—At the commencement of the season's work all available barges were ded with rock. On account of unexpectedly large receipts of ballast purchased n vessels arriving in the harbor, it became necessary to empty some of the barges. October 25 a small force was put to work unloading rock from barges to the bank, l this force was the nucleus of the sinking organization. Construction of quarters the bank at Amesville to accommodate the force while engaged in sinking the ttresses at that place was commenced on November 11. They were completed November 29. The cost of building comfortable quarters for a personnel of 125 was:

mber, 30,013 feet B. M., at $15 per M	$585.20
ils, roofing paper, hinges, locks, etc	72.86
bor and superintendence	376.60
rvices of tug, 2 days, at $27.20	54.40
Total	1,089.06
duct value of lumber recovered	526.68
Net cost of quarters	562.38

n December 3 the sinking plant was strung out, and the first mattress sunk in the esville revetment on December 5. By January 4 all mattresses that had been ed down to the harbor had been sunk, and it became necessary to temporarily end operations after placing 416,000 square feet of mattress covering the subeous bank at Amesville for a length of 1,570 feet by a width of 300 feet. Detailed l cost of this portion of the work was:

9.01 tons of rock, at $2.152	$6,647.55
nber, wire, nails, etc	444.30
Manchac, 34 days, at $27.20	924.80
cellaneous	13.00
visions	962.00
rolls	3,566.12
Total	12,557.77

The total field cost per square foot of mattress in place in revetment was $0.0751, apportioned as follows:

Construction	$0.0455
Towing	.0038
Sinking	.0258
Total	.0751

In addition to the subaqueous revetment a portion of the upper bank was graded and paved, local conditions calling for this work. Cost was:

632.18 tons rock, at $2.152	$1,360.45
Provisions	91.60
Pay rolls	311.42
Total	1,763.47

Area graded and paved, 16,256 square feet.

Cost per square foot, $0.108.

On January 11 all work at Amesville contemplated at the time was completed. A small force was retained to care for quarters, plant, and tows of mattresses as they arrived from time to time until February 18, when the plant was moved to the Third District Reach, the quarter boat *New Orleans*, which had returned from mattress construction, being used for quartering and subsisting the sinking force. By this time the river was rising rapidly and heavy drift was running. The plant was placed in position and the first mattress sunk in place on February 21, the river having risen to 10.4 on the Carrollton gauge. The last mattress was sunk March 14, with the river 4.4 feet below extreme flood height. On account of heavy drift it was necessary to string out an auxiliary line of barges at the upper end of the revetment to catch and hold the drift. Even with this, sufficient drift accumulated against the lowering barges to necessitate the plant being swung in against the bank after each sinking and again strung out for the next. The current was very strong, requiring the services of two powerful tugs to handle the mattresses and plant.

Notwithstanding all these obstacles the mattresses were sunk successfully in place at a higher stage of the river than ever before. The only accident occurred when the last mattress was in position for sinking, and was occasioned by the breaking of the cables holding the line of drift-catching barges. When the cables broke or pulled out, the mass of drift and barges floated down with the swift current, striking the sinking plant and so injuring the outer end of the mattress that it had to be cut off. The injured portion was landed, repaired, and sunk at a point farther downstream to form a part of future work. Practically no loss except that of time was sustained. In all 270,000 square feet of mattress was placed in revetment. The mattresses were 300 feet wide and covered 900 linear feet of bank. On account of the conditions described the work of sinking in the Third District Reach was more costly than usual, the detailed field cost being as follows:

1,997.82 tons of rock, at $2.152	$4,299.31
Lumber, wire, wire nails, etc	217.65
Tug *Manchac*, 15 days, at $27.20	408.00
Tug *Morganza*, 15 days, at $29.50	442.50
Tug *Tunica*, 11 days, at $28.65	315.15
Miscellaneous	10.00
Provisions	830.00
Pay rolls	2,684.67
Total	9,207.28

The total field cost per square foot of the mattress in place in revetment was $0.0834, apportioned as follows:

Construction	$0.0455
Towing	.0038
Sinking	.0341
Total	.0834

Rock.—Proposals for furnishing rock were opened on September 6, 1907. Only two were received, and the prices asked were considered excessive, and all bids were rejected. Open-market purchases were made and 9,752.72 tons of ballast obtained at

'erage price of $2.152 delivered on United States barges in New Orleans harbor. is, 5,719 tons were used, and the remainder, 4,033.72 tons, unloaded on the bank iture use.

stallation.—The cost of towing the quarter boat and other plant from the engineer t at New Orleans to Esperance bar, preliminary organization moving from rance to Bougere, from Bougere to Lums, and thence returning the quarter to New Orleans, also the installation of the sinking plant and force in New Orleans or, including the net cost of constructing quarters at Amesville, amounted to 1.08.

rveys.—A complete resurvey of that portion of the Mississippi River comprised ew Orleans Harbor has been made, the cost being charged to the allotment for ys. The cost of survey work incident to the location and placing of the revet- during the past season was $69.50.

mmary.—At Amesville, in the Westwego-Algiers Bend, a continuous mattress ment 300 feet wide and extending over 1,570 linear feet of bank was placed. In ird district reach, one-half the interval between spurs 2′ and 2½′ and spurs 3′ and as mattressed. Between spurs 2½′ and 3′ the interval was completely covered, etween spurs 3½′ and 4′ all but about 100 linear feet of the gap was mattressed. ggregate of the revetment work in the Third District Reach was 900 linear feet. g the season 756,000 spuare feet of mattress was placed, the consolidated expend- being as follows:

ruction of mattress and ways	$35,790.47
ng mattresses	2,387.55
ng mattresses	21,765.05
g and grading	1,763.47
llation	2,211.08
and other material unexpended	15,293.01
ys	69.50
llaneous	53.09
irs to plant	95.08
of plant	2,151.37
plant	5,044.64
expenses and administration	5,266.84
Total	91,891.15
ct last four items	12,557.93
	79,333.22
ct value of material on hand unexpended	15,293.01
Net field cost	64,040.21

near feet of bank revetted, 300 feet wide, 2,470; field cost per linear foot, $25.93.

nclusion.—During the period covered by this report no marked changes have rred affecting bank protection work in New Orleans Harbor, except that the pile ction work placed by the local authorities in the Third District Reach, after a trial n years, has been acknowledged to be a failure by those interested.

ps are herewith (Plates IV and V) showing the work of this and previous years. field work for New Orleans Harbor was in charge of Assistant Engineer H. S. las, assisted by Junior Engineers G. D. Waddill and C. T. Rayner, jr.

e amount expended from June 30, 1907, to June 30, 1908, is $92,215.13, distrib- as follows:

e expenses (main office)		$2,354.88
r administrative expenses		4,013.18
truction (hired labor):		
Materials	$34,740.05	
Wages	34,401.42	
Subsistence	9,210.78	
		78,352.25
eys		69.50
irs to plant		95.08
of plant		2,207.64
plant		5,058.31
ellaneous		64.29
Total		92,215.13

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $4,173.29, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot was $35,212.48, of which the pro rata share chargeable to the above work is estimated to be $11,913.25.

Abstract of appropriations.

Act of Congress.	Allotted.	Amount.
"Improving harbor at New Orleans, La.:"		
June 18, 1878 (river and harbor)		$50,000.00
March 3, 1879 (sundry civil)		60,000.00
June 16, 1880 (sundry civil)		75,000.00
Mar. 3, 1881 (river and harbor)		75,000.00
Aug. 2, 1882 (river and harbor)	By transfer	162.00
Jan. 19, 1884 (river and harbor)	do	1,400.00
July 5, 1884 (river and harbor)	do	4,900.00
July 13, 1892 (river and harbor)		80,000.00
Aug. 18, 1894 (sundry civil)		110,000.00
June 3, 1896 (river and harbor)	June 27, 1896	110,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	110,000.00
Received from sale of property		38.00
		676,501.00
"Improving Mississippi River, New Orleans Harbor:"		
Aug. 5, 1886 (river and harbor)		75,000.00
Aug. 11, 1888 (river and harbor)		a 199,888.00
Sept. 19, 1890 (river and harbor)	Oct. 15, 1890	90,000.00
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	10,000.00
Sept. 19, 1890 (river and harbor)	By transfer	8,000.00
June 4, 1897 (river and harbor)	do	10,000.00
June 4, 1897 (river and harbor)	do	40,000.00
June 13, 1902 (river and harbor)	July 12, 1902	95,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	85,000.00
June 30, 1906 (sundry civil)	June 28, 1906	10,000.00
Mar. 2, 1907 (river and harbor)	July 12, 1907	100,000.00
Received from sales, blueprints		1.75
		722,889.75
Grand total		1,399,391.75

a Original appropriation, $200,000; $112 reserved by Chief of Engineers for office expenses.

6. PLANT.

At date of last annual report the working plant of the district consisted of 52 large pieces. During the year six standard barges of creosoted timber, Nos. 22, 23, 24, 27, 44, and 45, have been constructed by hired labor. In addition one combined floating derrick and pile driver, and one hull for a levee-building machine has been built, and a small quarter boat purchased. With the additions mentioned the working plant now comprises 61 pieces. A small air-compressor plant has been installed and improvements made to buildings and grounds at the engineer depot, head of Millaudon street, New Orleans, La. During the past season a portion of the plant has been cared for at Giles Bend, Miss. Operations on the construction of new plant and the repair and care of that on hand were as follows:

Construction.—It having been demonstrated that reasonable bids for the building by contract of barges and other floating plant could not be obtained, construction by hired labor was undertaken. The first work of this character was the building of the five standard barges of creosoted lumber, mentioned in last report. The framing of these barges was commenced April 4, 1907, and the last barge was completed January 8, 1908. The lowest bid for the construction of the five barges was $28,445, and the cost of building by hired labor was $23,628.42, being $4,816.58 less than the lowest bid.

The construction of five additional barges has been authorized and one of these was completed on April 27. Work on the remaining four is well advanced.

A new combined derrick and pile driver has been completed. The dimensions of the hull, which is of creosoted timber, are 100 feet long, 30 feet wide, and 4 feet 9 inches deep at the gunwales. The hoisting engine and derrick have a lifting capacity of 10 tons. The boom is 75 feet long, and the mast is fitted with bull wheel and slewing

gear operated from the engine. Pile-driver leads are 75 feet high and are equipped with latest design of steam pile hammer. The machine has been placed in service with very satisfactory results.

A hull 102 feet long, 36 feet wide, and 6 feet deep, of creosoted timber, has been completed for the new levee-building machine.

The framing and creosoting of the timber for the hull of the new quarter boat authorized has been completed.

Repairs.—Repairs have been made as follows:

Designation.	Cost.	Work done.
Steamer Gen. John Newton	$1,100.62	Docked; hull below water line scraped and coat coal tar burned on; stage mast repaired; 5 new stationary fenders; new floor in kitchen; new cement floor in fire rooms; new stern bulkhead; nosing of boiler deck and rudder boxes repaired; boiler repaired as follows—new angle irons on after end, mud drums and seams on forward end calked, soft patch in port leg, 2 new hand-hole plates, and brickwork renewed.
Steamer Tensas	600.66	New sills under forward end pilot house and cabin; 4 new corner posts; doors altered; new deck on bow; exhaust pipe lengthened; new straps, gibs, and keys for main engines; feed pump, expansion joints, and water wheel repaired; engine room and outside of boat painted.
Dredge The Ram	1,352.59	New spud; 38 feet new guard rim; roof painted; deck coal tarred and sanded; 12 doors rescreened; water wheel repaired; one new tube in boilers; new bridge walls; new end on exhaust pipe; doctor and deck pump overhauled; new flanges on ends smoke boxes; miscellaneous painting.
Tug Morganza	903.56	Docked; hull below water line scraped and coat coal tar burned on; shoe straightened; new stern bushing and key for propellor; new valve stem in sea cock; forward journal cap refilled; all valves reground; wrecking pump overhauled; new inside smokestack. Miscellaneous painting and other repairs in progress.
Tug Tunica	710.99	Docked; new sleeve on shaft and new stern bushing; hull below water line scraped and coat coal tar burned on; rudder stock straightened and new tank on roof; new guard rim and top rail on starboard side; hold cleaned; miscellaneous painting and further repairs in progress.
Tug Marengo	856.83	New inside smokestack and 4 feet of outside stack; repairs to engine foundation air pump, boiler feed pump, sister kelsons, water-tight bulkhead; coal bunkers and skiff were made; alterations to cabin and painting of same; new brickwork in furnace. The old boiler has been hoisted out and old condensing apparatus removed, preparatory to the installation of a new boiler and jet condenser.
Tug Manchac	83.07	New side walls in furnace; minor repairs to machinery and boiler water-supply pipe.
Grader No. 5	808.15	Rake calked; new sills under cabin; 42 stanchions in hold to support deck; smokestack scraped and painted; new valves and valve seats for pumps; condenser overhauled; numerous alterations and improvements to cabin; miscellaneous painting,
Quarter boat Alpha	232.79	Docked; bottom, gunwales, and rakes patched and calked; 2 new cavils; doors and windows repaired.
Quarter boat Beta	43.75	Hold cleaned; new screen doors made; doors and windows repaired.
Quarter boat Gamma	692.94	Camel dock under each end; rakes repaired and calked; graving pieces in headblock; eyebolts with rings for spar fastenings; main deck on each end patched and calked; shear plank, guard rim, and nosing repaired; 3 screen doors made; repairs to cabin; outfit overhauled and repaired; outside of cabin painted.
Quarter boat Delta	831.74	Camel dock under each end; rakes, gunwales, and outriggers repaired and calked; new planking on guards; deck in dining room patched; two new iron water tanks on roof; 4 screen doors made and all openings rescreened; eyebolts with rings for spar fastenings; repairs to cabin; outfit overhauled and repaired; trimmings outside cabin painted.
Quarter boat Lake Borgne	793.07	Docked; new rake and deck beams; hull calked; building of new cabin in progress.
Barge No. 3	40.50	Rakes and sides calked.
Barge No. 4	63.50	Capstans and iron bitts rebolted; deck painted.
Barge No. 5 Barge No. 6 Barge No. 12 Barge No. 28 Barge No. 30	345.32	Camel dock under each end; rakes and sides calked.
Barge No. 8	296.60	Camel dock under each end; rakes calked; deck calked, covered with tarred paper, and sheathed.
Barge No. 10	38.75	Sheathing of deck repaired; tar paper and paint put under bitts; new capstan bars.

Designation.	Cost.	Work done.
Barge No. 11	$261.07	Docked; 12 broken deck beams reenforced; clamps on bull heads; new stanchions in hold; 5 new hatch coamings an gratings; bottom, sides, and rakes calked.
Barge No. 16	115.83	Camel dock under each end; rakes and sides calked; sheati ing on deck repaired.
Barge No. 18	82.45	Camel dock under each end; rakes calked; bulkhead r paired.
Barge No. 20	103.88	Camel dock under each end; rakes, headblocks, and sheati ing on sides repaired; rakes and sides calked.
Barge No. 29	93.58	Camel dock under each end; rakes repaired; 1 new iron bit sides and rakes calked.
Barge No. 31	256.65	Camel dock under each end; 13 short plank in rakes; 5 gra ing pieces in sides; sheathing of deck patched; rakes a sides calked.
Barge No. 32	174.48	Rakes and sides repaired and calked.
Barge No. 34	171.77	Docked; 1 new bottom plank; knuckle plank respiked: seams in rakes, 4 in sides, and all in bottom calked; ho cleaned.
Barge No. 37	124.88	Sides and rakes calked; deck sheathed.
Barge No. 38	26.85	Rakes repaired.
Barge No. 43	69.85	Sides and rakes calked.
Camel dock	35.50	Deck and trunk calked.
Skiffs	154.42	3 new skiffs built and 9 repaired.
Lighters	83.77	Current repairs and calking to 3 small lighters.
Wheelbarrows	67.10	230 repaired.
Reels and stands	90.49	14 reels and 47 reel stands for wire rope were made.
Stages and pumps	134.99	8 landing stages and 4 box pumps for equipment of barg were made.
Miscellaneous	88.18	Minor current repairs, costing less than $25 each, to t following: Launch Beatrice, quarter boat New Orlean barges 14, 19, and 41, stern dock, sectional dock, and offi building were made.
Total	12,055.87	

Care of plant.—In addition to the foregoing, the cost of caring for the plant whil not in use, including such items as watching at night, setting spars, putting out an taking in mooring lines, operating pump boat, salaries of one boat's crew, gener supervision, etc., amounted to $8,524.47.

Condition of plant.--With the exception of wear and tear incident to the operatio of the plant, the general condition is good, or will be made so by repairs now in prog ress. The hulls of quarter boats and barges built of untreated timber have continue to deteriorate, and the quarter boats *Beta*, *Gamma*, and *Delta* are in bad condition Barges *Nos. 1*, *2*, *3*, *20*, *21*, and *25* are now beyond economical repair.

The amount expended from June 30, 1907, to June 30, 1908, is $80,365.65, distrib uted as follows:

Office expenses (main office)		$1,375.6
Other administrative expenses		1,094.0
Repairs (hired labor):		
Materials	$9,557.87	
Wages	15,333.43	
Subsistence	1,685.15	
		26,576.4
Care of plant		8,636.0
New plant		2,216.0
Miscellaneous		10.9
		39,908.5
New plant, construction of barges, etc		40,457.1
Total		80,365.6

Abstract of appropriations.

PLANT.

Act of Congress.	Allotted.	Amount.
ug. 18, 1894 (sundry civil)	Sept. 8, 1894	$10,000.00
ne 4, 1897 (sundry civil)	Aug. 20, 1897	20,000.00
ransferred from Quartermaster's Department, authority Secretary of War	Sept. 21, 1898	8,000.00
ly 1, 1898 (sundry civil)	Mar. 13, 1899	5,556.00
ar. 3, 1899 (sundry civil)	do	64,444.00
ne 6, 1900 (sundry civil)	July 20, 1900	25,000.00
ne 13, 1902 (river and harbor)	July 12, 1902	111,000.00
roceeds of sale of engineer property		540.81
ar. 3, 1903 (sundry civil)	Apr. 16, 1903	22,000.00
Do	July 21, 1903	25,000.00
roceeds of sale of engineer property		5,351.74
Do		1,018.30
eceived for injuries to barge		18.00
pr. 28, 1904 (sundry civil)	Apr. 1, 1904	38,000.00
ar. 3, 1905 (sundry civil)	Apr. 26, 1905	45,000.00
ne 30, 1906 (sundry civil)	June 28, 1906	55,000.00
ar. 2, 1907 (river and harbor)	Apr. 6, 1907	65,000.00
roceeds of sale of engineer property		570.95
eceived from sale of blueprints		.25
Total		501,500.55

7. SURVEYS, GAUGES, AND OBSERVATIONS.

The Mississippi River Commission authorized the omission of the annual survey f Old River. The annual surveys of Kempe Bend, Giles Bend, and the sill dams n the Atchafalaya were made during the year.

Surveys were also made of Natchez Harbor and New Orleans Harbor. The survey f New Orleans Harbor was very complete, and showed contours of the river bed, ross sections of the river, topography along the river bank, and all wharves, buildings, etc., as well as piles and objects in the water which might in any way interfere ith navigation.

Of these surveys only the one of New Orleans Harbor was charged to the regular llotment for surveys, the cost of the others being charged to the work in progress.

Remarks on the conditions developed by the surveys will be found in the reports n the works at the various localities. The results of the survey of New Orleans Harbor will be made the subject of special report as directed by the resolution of he Commission providing for this survey.

In compliance with resolution of the Commission passed March 21, 1907, the following table showing best obtainable depths on crossings, when such depths were 4 feet or less, has been compiled:

Name of crossing.	Miles below Cairo.	Least depth.	Date.	Reading of nearest gauge.		Estimated distance between 14-feet contours.
				Locality.	Depth.	
		Feet.			*Feet.*	*Feet.*
ew Town	618	14	Nov. 9	Vicksburg	6.6	
odney	651	13	Nov. 26	St. Joseph	12.6	100
atches Island	706	13	Nov. 8	Natchez	9.2	100
orras	765	11	Nov. 12	Red River Landing	7.8	500

The amount expended from June 30, 1907, to June 30, 1908, is $5,299.48, distributed as follows:

Office expenses (main office)		$54.80
Other administrative expenses		214.80
Field work and drafting:		
Materials	$113.06	
Wages	4,265.06	
Subsistence	583.52	
		4,961.64
Care of plant		31.68
New plant		33.36
Miscellaneous		3.20
Total		5,299.48

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $61.29, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration.

Abstract of appropriations.

SURVEYS, GAUGES, AND OBSERVATIONS.

Act of Congress.	Allotted.	Amount.
"Survey, unleveed front, fourth district:"		
Aug. 2, 1882 (river and harbor)		$1,000.00
"Survey Cubbitts Gap and vicinity:"		
Aug. 2, 1882 (river and harbor)		a 137.14
"Observations at Carrollton, La.:"		
Aug. 2, 1882 (river and harbor)		3,000.00
Mar. 3, 1883 (river and harbor)		1,500.00
		4,500.00
"Discharge observations:"		
Aug. 11, 1888 (river and harbor)	Oct. 3, 1888	9,000.00
"Gauges:"		
Aug. 11, 1888 (river and harbor)	do	2,000.00
"Surveys, examinations, and contingencies:"		
Aug. 11, 1888 (river and harbor)	Dec. 20, 1888	1,000.00
Do	Mar. 20, 1890	3,000.00
		4,000.00
"Surveys, gauges, and observations:"		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	12,000.00
Do	By transfer	1,000.00
July 13, 1892 (river and harbor)	Aug. 10, 1892	12,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	12,000.00
Aug. 18, 1894 (sundry civil)	Sept. 8, 1894	12,000.00
Mar. 2, 1895 (sundry civil)	Apr. —, 1895	10,000.00
June 3, 1896 (river and harbor)	Aug. 25, 1897	500.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	5,000.00
June 6, 1900 (sundry civil)	May 27, 1899	5,000.00
Do	Nov. 28, 1900	1,000.00
June 13, 1902 (river and harbor)	July 12, 1902	5,000.00
Mar. 3, 1903 (sundry civil)	July 21, 1903	6,000.00
Apr. 28, 1904 (sundry civil)	Apr. 1, 1904	5,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	5,000.00
June 30, 1906 (sundry civil)	June 28, 1906	5,000.00
Mar. 2, 1907 (river and harbor)	July 12, 1907	5,000.00
Received from sales, blueprints		3.50
		96,503.50
Grand total		122,140.64

a Original allotment, $300; $162.86 transferred to New Orleans Harbor.

8. LEVEES.

For work of levee construction and maintenance, the fourth district, improving Mississippi River, is subdivided into seven levee districts. For limits of the districts, see current summary, also Plates VI to XI, inclusive, herewith. The plates show locations of all levees, whether built by State authorities or by the United States, levees completed during the year and those still under contract by the United States, profiles of the levee line, of the high waters of 1897, 1903, and 1907, and the approved Mississippi River Commission grade. These plates also show the general location of the several works of bank protection.

On July 1, 1907, the amount of levee work required to complete the contracts then in force was 1,627,681.02 cubic yards, at an average cost of 24.93 cents per cubic yard.

Under project approved April 30, 1907, for the expenditure of the allotments from the river and harbor act of March 2, 1907; together with the balance of former allotments, contracts were entered into since July 1, 1907, for 1,541,631.02 cubic yards of enlargement of old and construction of new levees at an average cost of 24.69 cents per cubic yard.

Construction.—The river remained at a sufficient elevation to seriously interfere with construction work until the latter part of July; after this date, however, a large amount of work was completed considering the unfavorable weather conditions. During the months of March and April, 1908, all levee construction work was interrupted by high water except at New Texas (786 R.) and Dreyfus Lower (875 L.), both of these being new levees.

No muck or base ditches were cut during the past season, as all of the old embankments enlarged were known to be free from leaks, and the foundations of all new levees were free from objectionable matter.

Following the custom of previous years, the tabular statements as to levee construction are for the period from May 1, 1907, to May 1, 1908. During this period the total amount of levee work completed and paid for by the United States was 1,562,708 cubic yards. The tables of completed and uncompleted levees herewith show the number of cubic yards constructed under each contract, unit prices and percentage in place.

Tables follow stating the percentage in length of existing levee system built wholly or in part by the United States, the changes in contents of the levee system during the year, with the proportion of the levees now built in each district, and the approximate present condition of the levee line in the fourth district as to grade.

Lower Tensas levee district

[Completed levees.]

[Unless otherwise stated, all levees are built to a grade established by the Mississippi River Commission and have a crown 8 feet wide with slopes of 3 on 1.]

Name of levee.	Miles below Cairo.	Date work completed.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Ashley, section 1	724 R	Mar. 1, 1908	1,398	14.3	Enlargement	11,274.62	20.00	$2,254.92
Ashland, section 1-2	737.5 R	July 31, 1907	3,343	11.1	do	24,253.20	19.95	4,838.82
Bougere:								
Lot 2, section 8	739.5 R	Nov. 1, 1907	400	18.0	New	22,283.66	27.00	6,016.59
Lot 10, sections 1-8	739.5 R	Dec 21, 1907	2,345	19.1	do	106,624.43	32.40	34,546.31
Lot 11, section 1	739.5 R	Jan. 30, 1908	200	20.0	do	9,715.05	36.98	3,592.62
Lot 13, sections 1-5	740 R	Feb. 1, 1908	1,000	21.8	do	69,569.25	36.50	25,392.78
Lot 14, section 7		Dec. 19, 1907	200	20.4	do	11,493.78	36.50	4,195.23
Lot 3, sections 4-6		Jan. 24, 1908	800	20.4	do	43,738.45	33⅓	14,579.48
Lot 4, sections 1-4 and 7	740.5 R	Jan. 14, 1908	1,400	20.1	do	81,713.49	33⅓	27,237.82
Lot 5, sections 1-3	741 R	Nov. 21, 1907	900	20.9	do	56,574.02	33.50	18,952.30
Lot 6, section 4	741.5 R	Jan. 15, 1908	200	22.0	do	13,326.20	34⅓	4,575.33
Lot 8, section 2	742 R	Aug. 19, 1907	800	17.8	do	14,320.04	19.00	2,720.81

Name of levee.	Miles below Cairo.	Date of contract.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Percentage in place.
			Feet.	*Feet.*			*Cents.*	
Ashley, sections 2-8	724 R.	Dec. 31, 1907	11,777	13.5	Enlargement	86,311.38	20.00	No work done.
Glasscock, sections 1-8	725 R.	do	8,309	17.2	do	98,646.81	26.90	Do.
Ardee, sections 1-8	726 R.	do	6,900	19.4	do	99,213.94	21.00	3 per cent.
Roseland, sections 1-8	727 R.	do	9,337	15.5	do	96,799.21	16.95	5 per cent.
Bougere:								
Lot 11, sections 2-5	739.5 R.	June 21, 1907	900	19.4	New	44,208.54	36.98	No work done.
Lot 15, sections 1-5			1,000	22.7	do	68,000.00	36.98	Do.
Lot 16, sections 1-5			900	23.6	do	66,000.00	36.98	Do.
Lot 17, sections 1-5			800	23.7	do	58,500.00	36.98	Do.
Lot 18, sections 1-5			800	23.6	do	59,000.00	36.98	Do.
Lot 19, sections 1-5			800	24.1	do	62,000.00	36.98	Do.
Lot 20, sections 1-5	740 R.	do	800	23.4	do	58,500.00	36.98	Do.
Lot 12, sections 1-8		Aug. 29, 1906	1,500	23.5	do	120,000.00	36.50	Do.
Lot 13, sections 6-8		do	700	21.8	do	39,281.85	36.50	4 per cent.
Lot 14, sections 1-6 and 8		do	1,600	20.4	do	85,418.00	36.50	No work done.
Lot 3, sections 1-3		Aug. 30, 1905	900	20.4	do	47,353.41	33⅓	26 per cent.
Lot 4, section 8	740.5 R.	do	300	20.1	do	16,170.38	33⅓	43 per cent.

Atchafalaya levee district.

[Completed levees, 1907-8.]

Name of levee.	Miles below Cairo.	Date work completed.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Torras, sections 1-6	765 R	Jan. 27, 1908	3,211	13.9	New	75,920.98	14.70	$11,160.38
New Texas, sections 2-3	786 R	Apr. 23, 1908	400	21.7	do	23,743.12	23.00	5,460.92

[Uncompleted levees.]

Name of levee.	Miles below Cairo.	Date of contract.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Percentage in place.
			Feet.	*Feet.*			*Cents.*	
New Texas, sections 1 and 4-8	786 R	Dec. 31, 1907	2,722	21.0	New	147,405.11	23.00	12 per cent.

Lafourche levee district.

[Completed levees, 1907-8.]

Name of levee.	Miles below Cairo.	Date work completed.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Columbia, sections 1-6	923.4 R	Nov. 9, 1907	12,700	11.0	Enlargement	73,760.62	13.75	$10,142.09
Waterford, sections 1-8	932.3 R	Jan. 23, 1908	16,544	9.3	New and enlargement.	105,866.06	11.48	12,100.49
Willswood, sections 1-2	951 R	Mar. 14, 1908	6,243	10.5	Enlargement	25,598.14	16.50	4,223.69

[Completed levees, 1907-8.]

Name of levee.	Miles below Cairo.	Date work completed.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Oakville, sections 1, 2, 4	992 R.	Jan. 31, 1908	9,268	9.3	Enlargement	41,382.39	17.40	$7,200.54
Magnolia, sections 1 and 4	1,013 R.	Feb. 26, 1908	6,470	9.0	do	24,152.25	17.70	4,263.95
Socola, sections 1, 2, 3	1,015 R.	Nov. 15, 1907	3,022	8.9	New and enlargement.	28,980.00	16.45	4,767.21
Socola dam	1,015 R.	Dec. 20, 1907	439	9.5	New	5,271.21	34.58+	1,823.03

[Uncompleted levees.]

Name of levee.	Miles below Cairo.	Date of contract.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Percentage in place.
			Feet.	*Feet.*			*Cents.*	
Oakville, section 3	993 R.	Sept. 19, 1905	2,500	9.3	Enlargement	12,959.57	17.40	90 per cent.
Magnolia, sections 2 and 3	1,014 R.	do	5,800	9.0	do	21,634.68	17.70	None.

Pontchartrain levee district.

[Completed levees, 1907-8.]

Name of levee.	Miles below Cairo.	Date work completed.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Gomez	855 L	Jan. 20, 1908	3,076	13.3	Enlargement	19,456.83	18.00	$3,502.23
St. Gabriel, sections 1, 4, 5	861 L	Mar. 12, 1908	6,470	17.2	do	34,102.73	19.00	6,479.52
Margaret, sections 4 and 5	863 L	Oct. 5, 1907	1,792	17.5	do	23,502.04	16.50	3,877.84
Dreyfus, section 1-4	874 L	Feb. 4, 1908	1,449	16.5	New	50,451.11	19.50	9,837.97
Dreyfus lower, sections 3 and 4	875 L	Apr. 21, 1908	700	17.0	do	27,099.68	19.25	5,216.69
Gem, sections 1-9	881 L	Feb. 7, 1908	2,193	19.1	do	100,063.80	21.70	21,713.84
Hermitage, sections 1-3	887 L	Sept. 15, 1907	4,005	14.0	Enlargement	34,683.44	16.50	5,722.77
Burnside	891 L	Feb. 21, 1908	2,152	9.8	do	18,644.18	16.½	3,052.98
Union, sections 3, 4, 5, 6, and 7	894 L	Mar. 5, 1908	6,825	13.4	New and enlargement.	66,212.96	15.½	10,180.24
Bourbon, sections 1-2	910 L	Aug. 16, 1907	2,400	12.7	Enlargement	24,899.77	16.50	4,108.46
Prospect, sections 1, 2, 3	935 L	Mar. 5, 1908	6,265	12.0	do	44,509.82	18.50	8,234.32
Sarpy, sections 1-2	936 L	Mar. 7, 1908	2,830	15.0	do	26,779.44	39.00	10,443.98
Pecan Grove, sections 1-6	941 L	Mar. 4, 1908	9,812	10.9	New and enlargement.	78,374.28	14.99	11,748.48

Ponchartrain levee district.

[Uncompleted levees, 1907-8.]

Name of levee.	Miles below Cairo.	Date of contract.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Percentage in place.
			Feet.	*Feet.*			*Cents.*	
Hollywood, sections 1-9	845 L.	Dec. 31, 1907	16,700	16.5	Enlargement	115,560.02	17.94	4 per cent.
St. Gabriel, sections 2, 3, 6, 7	861 L.	July 22, 1907	7,877	17.0	do	44,704.67	19.00	15 per cent.
Dreyfus lower, sections 1, 2, 5, 6, and 7	875 L.	Dec. 31, 1907	1,670	16.7	New	58,870.22	19.25	24 per cent.
Union, sections 1, 2, and 8	894 L.	Oct. 1, 1906	4,616	13.4	Enlargement	38,108.49	15½	47 per cent.
Prospect, section 4	935 L.	July 22, 1907	1,992	12.7	do	14,463.79	18.50	36 per cent.

[Completed levees, 1907-8.]

Name of levee.	Miles below Cairo.	Date work completed.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Total cost.
			Feet.	*Feet.*			*Cents.*	
Woodlawn, sections 1, 2, 3	992 L	Mar. 4, 1908	8,440	7.0	New and enlargement.	33,028.01	22.00	$7,266.16
Fairview, sections 1, 2, 3, 4	994 L	Feb. 28, 1908	12,041	8.2	Enlargement.	44,537.64	21.00	9,352.90
Monsecour, sections 1, 2, 3	999 L	Nov. 25, 1907	4,013	11.5	New and enlargement.	39,869.78	17.75	7,076.89
Burton to Louderbough	1,022 L	Dec. 27, 1907	8,472	6.9	Enlargement.	26,933.12	23.50	6,329.28

[Uncompleted levees.]

Name of levee.	Miles below Cairo.	Date of contract.	Length of levee.	Average height above ground surface.	New or enlargement.	Total cubic yards.	Price per cubic yard.	Percentage in place.
			Feet.	*Feet.*			*Cents.*	
Woodlawn, section 4	992 L.	Dec. 27, 1907	3,593	7.0	New and enlargement.	11,523.27	22.00	10 per cent.

Percentage of length of existing levee system built wholly or in part by the United States.

Name of district.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.
	Per ct.	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*	*Per ct.*
Lower Tensas	66	72	71.0	71.0	72	73.0	73.0	63.0	64.0	64.5	64.7
Atchafalaya	65	67	68.0	69.0	68	67.9	68.0	65.5	66.7	64.7	63.7
Lafourche	61	62	75.0	82.0	83	78.0	77.7	77.6	77.6	77.0	77.0
Barataria	50	54	63.0	55.0	55	55.0	55.0	56.5	55.2	62.6	61.6
Pontchartrain	75	77	80.0	78.0	78	79.0	80.0	86.9	88.2	88.7	88.8
Lake Borgne	65	66	44.5	46.0	46	46.0	44.5	49.7	48.6	54.0	54.3
Whole fourth district, improving Mississippi River	65	66	67 2	68.7	69	68.6	66.3	66.5	66.8	70.8	69.2

Tabulated statement showing condition of levees and levee work for period from May 1, 1907, to May 1, 1908.

Levee district.	In system.	Built.	Contents in 1907.	Built since by United States.	Built since by local authorities.	Constructed in 1908.
	Miles.	*Miles.*	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*
Lower Tensas	160.92	152.64	21,035,860	464,886	1,188,289	1,653,175
Atchafalaya	128.60	128.60	21,734,975	99,664	577,826	677,490
Lafourche	82.21	82.21	9,146,640	205,225	274,911	480,136
Barataria	71.88	71.88	3,280,617	99,785	208,669	308,454
Pontchartrain	125.69	125.69	17,485,077	548,780	192,459	741,239
Lake Borgne	77.08	77.08	3,785,499	144,368	59,943	204,311
Total	646.38	638.10	76,468,668	1,562,708	2,502,097	4,064,805

Levee district.	Lost during year.	Contents in 1908.	Required to complete.	Estimated final contents.	Percentage now built.
	Cubic yds.	*Cubic yds.*	*Cubic yds.*	*Cubic yds.*	
Lower Tensas	793,316	21,895,719	8,603,277	30,498,996	71.0
Atchafalaya	369,339	22,043,126	3,196,689	25,239,815	87.0
Lafourche	229,719	9,397,057	2,203,842	11,600,899	80.9
Barataria	161,200	3,427,871	1,106,477	4,534,348	75.6
Pontchartrain	243,840	17,982,476	3,865,781	21,848,257	82.0
Lake Borgne	34,000	3,955,810	1,375,908	5,331,718	74.2
Total	1,831,414	78,702,059	20,351,974	99,054,033	79.5

Table showing the condition of levees in the fourth district as to grade.

District.	Levees.						
	Less than 1 foot above highest water.	1 foot to 2 feet above highest water.	2 to 3 feet above highest water.	3 to 4 feet above highest water.	4 to 5 feet above highest water.	Up to grade.	Total length.
	Miles.	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*	*Miles.*
Lower Tensas [a]	.....	.....	13.51	57.06	35.16	47.86	153.59
Atchafalaya	.....	.....	.70	7.14	.....	120.54	128.60
Lafourche [b]	.....	3.51	6.91	4.30	.....	66.48	82.21
Barataria [c]	9.33	22.23	15.93	23.39	.....	10.04	71.88
Ponchartrain [d]	.....	2.06	6.03	10.40	.....	107.18	125.69
Lake Borgne [e]	5.04	25.56	21.83	25.83	.....	11.12	78.38
Total	14.37	53.36	64.90	155.51	35.16	364.22	640.22

[a] The grade in this district varies from 5 to 6.2 feet above the highest water.
[b] The grade in this district varies from 2.9 to 4.2 feet above the highest water. The length given from 3 to 4 feet is below grade.
[c] Refers to high water of 1907.
[d] The grade varies from 3.4 to 4.6 feet above highest water. Length given as 3 to 4 feet is below grade.
[e] Refers to high water of 1907.

Protection against high water.—The ends of the new Bougere levee (738-740-R), being constructed by the United States, are protected by the Texas and Pacific Railway embankment.

Although the river has been above the flood stage in all points in the district, the levee line is in such good condition that no protection work has been necessary.

Repairs.—In the Pontchartrain levee district a drainage ditch was excavated in front of the Southwood levee (876-L) at a cost of $512.02.

Revetment.—Resolution of November 23, 1906, of the Mississippi River Commission, authorized the construction of a concrete revetment on the Bertrandville levee (990-L) and on the Socola levee (1015-R).

The concrete revetment was placed on the Bertrandville levee, Lake Borgne levee district, in September, 1907, about ten months after the completion of the levee.

This revetment consisted in a concrete pavement on the slope of the levee from 1 foot above the 1907 high water to the toe of the levee and a concrete curb extending at the toe of the levee 2 feet vertically into the berme. The paved surface had a slope of 2½ to 1, with a vertical height of 5½ feet, thus giving a paved surface of a little more than 12 square feet to each linear foot of levee. Different methods of paving were used as an experiment. For a length of 262 feet there were placed, normal to the axis of the levee, 2-inch by 2-inch pine strips at intervals of 3 feet; upon these strips Clinton wire cloth (6-inch by 6-inch mesh, No. 10 wire) was fastened with staples. A layer of concrete about 3 inches thick was then placed on the slope, covering the strips supporting the wire cloth by 1½ inches.

For a length of 118 feet the pavement was the same with the exception that additional strips were placed immediately above the ones supporting the wire cloth, thus dividing the pavement into panels of 3 feet width.

For a length of 88 feet the pavement was the same as the preceding except that the panels were 6 feet wide.

For a length of 113 feet no strips were used, the wire being supported on stakes driven into the slopes of the levee.

For a length of 357 feet no wire cloth was used; some of the concrete was placed in a continuous sheet, some in 3-foot panels, and some in 6 foot panels. For this length the concrete was 4 inches thick instead of 3 inches.

The entire length of levee paved was 938 feet. The cost was $1,225.69, or $1.31 per linear foot, or 9½ cents per square foot.

The proportions for the concrete were 1 part cement, 3½ parts sand, and 7 parts gravel.

Work on the concrete revetment at Socola levee (1015-R), Barataria levee district, was begun on December 27, 1907, immediately after the completion of the levee. For a length of 1,072 feet the revetment was placed on a slope of 2 to 1, and for a length of 250 feet on a slope of 3 to 1. The upper edge of the revetment was 1 foot above the 1907 high water and averaged 8 feet in vertical height on that part on which the slope was 2 to 1 and 7 feet on that part where the slope was 3 to 1. Normal to the axis of the levee, and at intervals of 4 feet, 2 by 2 inch pine strips were placed, to which strips was fastened the Clinton wire cloth (6 by 6 inch mesh, No. 10 wire). A layer of concrete 3½ inches thick was placed on the slope of the levee and extended 2 feet vertically into the berme of the levee.

The proportions for the concrete were 1 part cement, 5 parts sand, and 8 parts gravel.

The work amounted to 27,420 square feet of pavement and cost $2,828, or 10.32 cents per square foot.

So far this type of revetment has been very satisfactory and has materially reduced the seepage during high water.

At the Burton to Louderbough levee (1022-L), Lake Borgne levee district, a wooden revetment was built for a length of 8,472 feet, at a cost of $6,293.46.

Levee-building machine.—On June 7, 1907, the proposal of the McMyler Manufacturing Company for the construction and delivery of a levee-building machine for the sum of $15,150 was accepted.

This machine was completed in February, 1908, and a payment of 70 per cent, or $10,605, was made. A preliminary trial developed the necessity of a few minor changes. These changes were made in March, but as the machine is standing on the bank at the United States engineer depot and the river has been over this bank since the completion of the machine, it has not yet been given the thirty-day trial required by agreement before acceptance.

This machine is of the self-contained revolving type, equipped with and arranged to operate a 2-cubic-yard orange-peel bucket at 70 feet radius. It is mounted on four 4-wheel trucks and is provided with the necessary mechanism for performing the operations of hoisting, rotating, traveling, and operating an automatic bucket.

A barge for transporting the machine and from which the machine can be operated during high water is now in course of construction. The hull of a quarter boat was

purchased and a house is now being erected on same. This quarter boat will be used for the men employed on the machine.

The amount spent so far on the barge, quarter boat, and outfit is $5,729.82.

Abandoned levees.—The following table gives the history of each levee abandoned by the construction of new levees from May 1, 1907, to May 1, 1908:

Name.	Miles below Cairo.	District.	Length.	By whom built.	When built.	By whom last enlarged.	When last enlarged.
			Feet.				
Bedford	608-R	Lower Tensas	5,127	State	1898		
			8,383	do	1867	State	1897
L'Argent	679-R	do	3,895	do	1891	United States	1900
			2,361	do	1885	do	1895
Deer Park	722-R	do	1,284	do	1904		
			2,826	United States.	1887	State	1902
Torras	765-R	Atchafalaya	1,305	do	1894	do	1897
			1,555	State	1867	do	1897
Chenango	842-R	do	400	United States.	1895	United States.	1900
			2,179	State	1874	State	1904
White Castle	870-R	do	7,929	United States.	1894	do	1905
Donaldsonville	886-R	Lafourche	3,930	Riparian owners.	1867	do	1893
Acadia	896-R	do	1,426	State	1878	do	1903
			525	do	1904		
Breau	914-R	do	730	do	1879	United States.	1905
Waterford	933-R	do	1,373	do	(a)	do	1896
Live Oak	991-R	Barataria	2,050	(b)	(b)	State	1904
			875	(b)	(b)	do	1897
Jesuits Bend	992-R	do	3,459	(b)	(b)	United States.	1896
			156	United States.	1896		
La Reussite	996-R	do	1,105	(b)	(b)	United States.	1896
			769	(b)	(b)	do	1896
Socola	1,017-R	do	505	(b)	(b)	State	1897
			232	United States.	1896		
			155	State	1901		
Kamlak	1,028-R	do	1,790	(b)	(b)	State	1899
			774	(b)	(b)	(b)	(b)
McDonogh Farm.	1,030-R	do	243	State	1897		
			1,077	(b)	(b)	State	1899
			197	United States.	1893	United States.	1905
Dreyfus	847-L	Pontchartrain	1,034	State	1879	do	1905
			223	United States.	1890	do	1905
Gem	880-L	do	1,300	State	1888	State	1899
			632	do	1888	United States.	1902
Union	894-L	do	80	United States.	1891	do	1897
			1,316	State	1889		
Ormond	938-L	do	550	do	1879	United States	1899
Pecan Grove	942-L	do	1,768	do	1879	do	1899
Albert Spies	950-L	do	2,431	do	1882	State	1900
Chalmette	971.5-L	Lake Borgne	540	United States	1896		
Woodlawn	992-L	do	584	(b)	(b)	United States	1897
Monsecour	999-L	do	2,493	(b)	(b)	do	1896
Martin	1,023-L	do	2,061	(b)	(b)	State	1896
Waltzer	1,027-L	do	811	State	1900	do	1899

a More than twenty years ago. b Not known.

The number of cubic yards in abandoned sections of levee was as follows: In the Lower Tensas district, 793,316 cubic yards; in the Atchafalaya district, 369,339 cubic yards; in the Lafourche district, 229,719 cubic yards; in the Barataria district, 116,200 cubic yards; in the Pontchartrain district, 243,840 cubic yards, and in the Lake Borgne district, 34,000 cubic yards.

Supervision.—All levee work in the fourth district is under the supervision of Assistant Engineer W. E. Knobloch, assisted by Junior Engineers W. C. Barton, John Klorer, and George C. Schoenberger.

The detailed expenditures during the fiscal year and the abstracts of allotments for each levee district follow:

The amount expended from June 30, 1907, to June 30, 1908, is $166,096.06, distributed as follows:

Office expenses (main office)	$7,932.[illegible]
Other administrative expenses	5,586.[illegible]
Construction of levees (contract)	151,661.[illegible]
Surveys	544.[illegible]
Care of plant	6.[illegible]
New plant	345.[illegible]
Miscellaneous	19.[illegible]
Total	166,096.[illegible]

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $445.95, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot was $35,212.48, of which the pro rata share chargeable to the above work is estimated to be $352.12.

ABSTRACT OF APPROPRIATIONS.

Lower Tensas levee district.

Act of Congress.	Allotted.	Amount.
"Levees, Tensas front:"		
Aug. 2, 1882 (river and harbor)		$426,160.00
Jan. 19, 1884 (river and harbor)		21,000.00
Do	By transfer	3,000.00
July 5, 1884 (river and harbor)		90,000.00
Do		8,710.00
Do	By transfer	3,400.00
Do	June 16, 1886	1,000.00
Aug. 5, 1886 (river and harbor)	Nov. 20, 1886	11,100.00
Do	July 7, 1887	15,000.00
Do	Aug., 1887	150,000.00
Aug. 11, 1888 (river and harbor)	Oct. 3, 1888	[a] 160,000.00
		889,370.00
"Protection of levees, Tensas front:"		
Aug. 5, 1886 (river and harbor)	Mar. 4, 1887	7,000.00
Do	Aug. —, 1887	6,000.00
Aug. 11, 1888 (river and harbor)	Oct. 3, 1888	10,000.00
		23,000.00
"Levees, Tensas Basin:"		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	199,500.00
Do	By transfer	38,475.00
Do		11,542.50
Do	By transfer	1,334.75
Do	do	3,000.00
Aug. 5, 1886 (river and harbor)	Reallotted from sales.	21.00
		253,873.25
"Protection of levees, Tensas Basin:"		
Sept. 19, 1890 (river and harbor)		9,525.00
Do	By transfer	607.50
Do	do	70.25
Do	do	5,000.00
Do	do	5,000.00
		20,202.75
"Protection of levees, Fourth District:"		
Aug. 11, 1888 (river and harbor)		29,211.94
"Lower Tensas levee district:"		
July 13, 1892 (river and harbor)	Aug. 10, 1892	150,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	132,000.00
Aug. 18, 1894 (sundry civil)		[b] 67,000.00
Mar. 2, 1895 (sundry civil)		[c] 89,300.00
June 3, 1896 (river and harbor)	June —, 1896	45,000.00
June 4, 1897 (sundry civil)	Aug. 20, 1897	228,700.00
July 19, 1897 (deficiency)	July 19, 1897	45,000.00
July 1, 1898 (sundry civil)	Mar. 10, 1898	120,000.00
Do	June 29, 1898	30,000.00
Do	Jan. 17, 1899	3,000.00
Do	Jan. 24, 1899	5,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	217,300.00
June 6, 1900 (sundry civil)	July 20, 1900	110,000.00
June 13, 1902 (river and harbor)	July 12, 1902	110,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	110,000.00
Apr. 28, 1904 (sundry civil)	June 25, 1903	110,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	110,000.00
Mar. 3, 1905 (river and harbor)	July 29, 1905	85,000.00
June 30, 1906 (sundry civil)	June 28, 1906	235,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	300,000.00
Received from sales, blueprints		.50
		2,302,360.50
Grand total		3,518,018.44

[a] Original allotment, $175,000; $5,000 transferred to protection of third district; $10,000 to protection, fourth district.
[b] Original allotment, $132,000; $65,000 transferred to Middle Tensas district.
[c] Original allotment, $132,000; $40,000 transferred to Middle Tensas district and $2,640 to Homochitto district.

The amount expended from June 30, 1907, to June 30, 1908, is $24,804.61, distributed as follows:

Office expenses (main office)	$1,002.81
Other administrative expenses	2,317.92
Construction of levees (contract)	21,012.20
Surveys	389.47
New plant	76.85
Miscellaneous	5.36
Total	24,804.61

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $415.91, for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot was $35,212.48, of which the pro rata share chargeable to the above work is estimated to be $352.12.

ABSTRACT OF APPROPRIATIONS.

Atchafalaya levee district.

Act of Congress.	Allotted.	Amount.
"Atchafalaya front:"		
Aug. 2, 1882 (river and harbor)		$110,000.00
Jan. 19, 1884 (river and harbor)		5,000.00
Do.		4,000.00
Do.		15,000.00
Do.		[a] 2,800.00
Aug. 3, 1886 (river and harbor)		40,000.00
		176,800.00
"Levees, right bank, below Red River:"		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	123,975.00
Do.	By transfer	41,562.50
Do.	do	12,468.75
Do.	do	1,441.15
		179,447.40
"Protection of levees, right bank, below Red River:"		
Sept. 19, 1890 (river and harbor)		6,222.30
"Protection of levees, fourth district:"		
Aug. 11, 1888 (river and harbor)		23,663.00
"Atchafalaya levee district:"		
July 13, 1892 (river and harbor)	Aug. 10, 1892	155,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	152,000.00
Aug. 18, 1894 (sundry civil)		[b] 147,366.96
Mar. 2, 1895 (sundry civil)		[c] 148,960.00
June 3, 1896 (river and harbor)	June —, 1896	28,125.00
June 4, 1897 (sundry civil)	Aug. 20, 1897	138,600.00
July 19, 1897 (deficiency)	July 19, 1897	28,125.00
July 1, 1898 (sundry civil)	Mar. 10, 1898	70,000.00
Do.	June 29, 1898	17,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	98,800.00
June 6, 1900 (sundry civil)	July 20, 1900	55,000.00
June 13, 1902 (river and harbor)	July 12, 1902	40,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	40,000.00
Apr. 28, 1904 (sundry civil)	July 21, 1903	40,000.00
Mar. 3, 1905 (sundry civil)	July 29, 1905	40,000.00
Mar. 3, 1905 (river and harbor)	Apr. 26, 1905	30,000.00
June 30, 1906 (sundry civil)	June 28, 1906	25,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	30,000.00
		1,282,976.96
Grand total		1,670,109.66

[a] Original allotment, $12,000; $9,200 transferred to Tensas front, New Orleans Harbor, and mouth of Red River.
[b] Original allotment, $152,000; $4,633.04 transferred to Pontchartrain levee district.
[c] Original allotment, $152,000; $3,040 transferred to Homochitto levee district.

The amount expended from June 30, 1907, to June 30, 1908, is $28,576.45, distributed as follows:

Office expenses (main office)	$490.47
Other administrative expenses	1,938.22
Construction of levees (contract)	25,833.94
Surveys	261.72
New plant	50.00
Miscellaneous	2.10
Total	28,576.45

In compliance with resolution of the commission adopted April 9, 1906, there should be added to the above total cost for the year $415.91 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant, for care and repair of plant during the lay-off season and at the engineer depot, was $35,212.48, of which the pro rata share chargeable to this work is estimated to be $352.12.

ABSTRACT OF APPROPRIATIONS.

Lafourche levee district.

Act of Congress.	Allotted.	Amount.
"Protection of levees, right bank, below Red River:"		
Sept. 19, 1890 (river and harbor)		$6,222.30
"Protection of levees, fourth district:"		
Aug. 11, 1888 (river and harbor)		32,536.62
"Lafourche levee district:"		
July 13, 1892 (river and harbor)	Aug. 10,1892.	90,000.00
Mar. 3, 1893 (sundry civil)	May 18,1893.	90,000.00
Aug. 18, 1894 (sundry civil)		90,000.00
Mar. 2, 1895 (sundry civil)		[a] 88,200.00
June 3, 1896 (river and harbor)	June —,1896.	8,437.50
June 4, 1897 (sundry civil)	Aug. 20,1897.	41,600.00
July 19, 1897 (deficiency)	July 19,1897.	8,437.50
July 1, 1898 (sundry civil)	Mar. 10,1898.	24,000.00
Do	June 29,1898.	12,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13,1899.	37,050.00
June 6, 1900 (sundry civil)	July 20,1900.	28,000.00
June 13, 1902 (river and harbor)	July 12,1902.	20,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25,1903.	20,000.00
Apr. 28, 1904 (sundry civil)	July 21,1903.	40,000.00
Mar. 3, 1905 (sundry civil)	July 29,1905.	40,000.00
Mar. 3, 1905 (river and harbor)	Apr. 26,1905.	15,000.00
		652,725.00
Grand total		691,483.92

[a] Original allotment, $90,000; $1,800 transferred to Homochitto levee district.

The amount expended from June 30, 1907, to June 30, 1908, is $29,149.25, distributed as follows:

Office expenses (main office)	$91.00
Other administrative expenses	2,981.26
Construction of levees (contract)	12,995.91
Surveys	18.50
New plant	10.00
Repairs to levees	1,564.81
Revetment of levees	2,526.68
Levee-building machine	8,956.99
Miscellaneous	4.10
Total	29,149.25

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $318.21 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant for care and repair of plant during the lay-off season and at the engineer depot was $35,212.48, of which the pro rata share chargeable to the above work is estimated to be $176.02.

ABSTRACT OF APPROPRIATIONS.

Barataria levee district.

Act of Congress.	Allotted.	Amount.
"Protection of levees, fourth district:"		
Aug. 11, 1888 (river and harbor)		$2,947.87
"Barataria levee district:"		
July 13, 1892 (river and harbor)	Aug. 10, 1892	60,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	60,000.00
Aug. 18, 1894 (sundry civil)		60,000.00
Mar. 2, 1895 (sundry civil)		a 58,800.00
June 3, 1896 (river and harbor)	July 19, 1897	3,937.50
June 4, 1897 (sundry civil)	Aug. 20, 1897	19,400.00
July 19, 1897 (deficiency)	July 19, 1897	3,937.50
July 1, 1898 (sundry civil)	Mar. 10, 1898	15,000.00
Do	June 29, 1898	12,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	24,700.00
June 6, 1900 (sundry civil)	July 20, 1900	14,000.00
June 13, 1902 (river and harbor)	July 12, 1902	10,000.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	10,000.00
Apr. 28, 1904 (sundry civil)	June 25, 1903	15,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	15,000.00
Mar. 3, 1905 (river and harbor)	July 29, 1905	15,000.00
June 30, 1906 (sundry civil)	June 28, 1906	10,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	25,000.00
		431,775.00
Grand total		434,722.87

a Original allotment, $60,000; $1,200 transferred to Homochitto levee district.

The amount expended from June 30, 1907, to June 30, 1908, is $115,711.85, distributed as follows:

Office expenses (main office)	$1,188.76
Other administrative expenses	5,977.26
Construction of levees (contracts)	107,800.39
Surveys	21.16
Repairs to levees	581.40
Care of plant	3.70
New plant	131.67
Miscellaneous	7.51
Total	115,711.85

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $415.91 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant for care and repair of plant during the lay-off season and at the engineer depot was $35,212.48, of which the pro rata share chargeable to the above work is estimated to be $352.12.

ABSTRACT OF APPROPRIATIONS.

Pontchartrain levee district.

Act of Congress.	Allotted.	Amount.
"Bonnet Carre Crevasse:'		
Aug. 2, 1882 (river and harbor)		$15,000.00
"Levees left bank below Red River:"		
Sept. 19, 1890 (river and harbor)	Dec. 4, 1890	89,775.00
Do		21,850.00
Do		6,750.70
Do		780.90
		119,156.60
"Protection of levees, left bank below Red River:"		
Sept. 19, 1890 (river and harbor)		6,563.00
Do	By transfer	355.30
Do	do	41.10
Do	do	3,000.00
		9,959.40
"Protection of levees, fourth district:"		
Aug. 11, 1888 (river and harbor)		15,630.57
"Pontchartrain levee district:"		
July 13, 1892 (river and harbor)	Aug. 10, 1892	150,000.00
Mar. 3, 1893 (sundry civil)	May 18, 1893	150,000.00
Aug. 18, 1894 (sundry civil)		150,000.00
Do	By transfer	4,633.04
Mar. 2, 1895 (sundry civil)		[a]147,000.00
June 3, 1896 (river and harbor)	June —, 1896	22,500.00
June 4, 1897 (sundry civil)	Aug. 20, 1897	113,150.00
July 19, 1897 (deficiency)	July 19, 1897	22,500.00
July 1, 1898 (sundry civil)	Mar. 10, 1898	60,000.00
Do	June 29, 1899	16,000.00
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899	74,100.00
June 6, 1900 (sundry civil)	July 20, 1900	50,000.00
June 13, 1902 (river and harbor)	July 12, 1902	101,500.00
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903	81,500.00
Apr. 28, 1904 (sundry civil)	June 25, 1903	90,000.00
Mar. 3, 1905 (sundry civil)	Apr. 26, 1905	90,000.00
Mar. 3, 1905 (river and harbor)	July 29, 1905	60,000.00
June 30, 1906 (sundry civil)	June 28, 1906	35,000.00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907	120,000.00
Received from sales, blue prints		.25
		1,537,883.29
Grand total		1,697,629.86

[a]Original allotment, $150,000; $3,000 transferred to Atchafalaya levee district.

The amount expended from June 30, 1907, to June 30, 1908, is $47,696.72, distributed as follows:

Office expenses (main office)	$104.61
Other administrative expenses	2,217.34
Construction of levees (contract)	28,628.04
Surveys	74.60
New plant	12.62
Care of plant	3.54
Repairs to levees	283.34
Revetment of levees	7,363.26
Levee building machine	8,993.37
Miscellaneous	16.00
Total	47,696.72

In compliance with resolution of the Commission adopted April 9, 1906, there should be added to the above total cost for the year $284.55 for use and deterioration of plant, being a charge of 3 per cent per annum for use of plant and 4 per cent per annum for deterioration. During the year the total amount charged to the allotment for plant for care of and repair of plant during the lay-off season and at the engineer depot was $35,212.48, of which the pro rata share chargeable to the above work is estimated to be $176.02.

ABSTRACT OF APPROPRIATIONS.

Lake Borgne levee district.

Act of Congress.	Allotted.	Amount
July 13, 1892 (river and harbor)	Aug. 10, 1892	$50,0
Mar. 3, 1893 (sundry civil	May 18, 1893	50.0
Aug. 18, 1894 (sundry civil)		50.0
Mar. 2, 1895 (sundry civil)		a 49,0
June 3, 1896 (river and harbor)	June —, 1896.	4,5
June 4, 1897 (sundry civil)	Aug. 20, 1897.	22,2
July 19, 1897 (deficiency)	July 19, 1897.	4,5
July 1, 1898 (sundry civil)	Mar. 10, 1898.	16,0
July 1, 1898 (sundry civil)	June 29, 1898.	8,0
Mar. 3, 1899 (sundry civil)	Mar. 13, 1899.	24,7
June 6, 1900 (sundry civil)	July 20, 1900.	14,5
June 13, 1902 (sundry civil)	July 12, 1902.	10,0
June 13, 1902 (sundry civil)	Mar. 4, 1903.	2,0
Mar. 3, 1903 (sundry civil)	Nov. 25, 1903.	10,0
April 28, 1904 (sundry civil)	June 25, 1903.	15.0
Mar. 3, 1905 (sundry civil)	April 26, 1905.	15,0
Mar. 3, 1905 (river and harbor)	July 29, 1905.	15.00
June 30, 1906 (sundry civil)	June 28, 1906.	10,00
Mar. 2, 1907 (river and harbor)	Mar. 27, 1907.	25,00
Total		395,40

a Original allotment $50,000; $1,000 transferred to Homochitto levee district.

Money statements.

BONDURANT CHUTE REVETMENT.

July 1, 1907, balance unexpended		$6,275.0
Amount allotted from sundry civil act approved May 27, 1908		2,000.0
		8,275.0
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$6,023.88	
For maintenance of improvement	250.00	
		6,273.8
July 1, 1908, balance unexpended		2,001.
July 1, 1908, outstanding liabilities		1.
July 1, 1908, balance available		2,000.

KEMPE BEND REVETMENT.

July 1, 1907, balance unexpended		$47,338.
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$8,980.95	
For maintenance of improvement	6,706.00	
		15,686
July 1, 1908, balance unexpended		31,652
July 1, 1908, oustanding liabilities		1,076
July 1, 1908, balance available		30.575
Amount (estimated) required for completion of existing project		Indetermin
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$25,000.00	
For maintenance of improvement	25,000.00	
		$50,000
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

NATCHEZ AND VIDALIA HARBORS, MISSISSIPPI AND LOUISIANA.

uly 1, 1907, balance unexpended		$7,283.33
mount allotted from river and harbor act, March 2, 1907		175,000.00
mount allotted from sundry civil act approved May 27, 1908		75,000.00
		257,283.33
une 30, 1908, amount expended during fiscal year:		
For works of improvement	$122,888.54	
For maintenance of improvement	12,560.00	
		133,448.54
uly 1, 1908, balance unexpended		121,834.79
uly 1, 1908, outstanding liabilities		992.92
uly 1, 1908, balance available		120,841.87
mount (estimated) required for completion of existing project		Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$75,000.00	
For maintenance of improvement	10,000.00	
		85,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

ATCHAFALAYA AND RED RIVERS, LOUISIANA.

ly 1, 1907, balance unexpended	$13,308.28
ne 30, 1908, amount expended during fiscal year for maintenance of improvement	3,106.88
ly 1, 1908, balance unexpended	10,201.40
ly 1, 1908, outstanding liabilities	67.08
ly 1, 1908, balance available	10,134.32
mount (estimated) required for completion of existing project	Indeterminate.

HARBOR AT NEW ORLEANS, LA.

uly 1, 1907, balance unexpended		$217.47
ale of blueprints		1.25
mount allotted from river and harbor act, March 2, 1907		100,000.00
mount allotted from sundry civil act approved May 27, 1908		150,000.00
		250,218.72
une 30, 1908, amount expended during fiscal year for maintenance of improvement		92,215.13
uly 1, 1908, balance unexpended		158,003.59
uly 1, 1908, outstanding liabilities		3,459.83
uly 1, 1908, amount available		154,543.76
mount (estimated) required for completion of existing project		Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$125,000.00	
For maintenance of improvement	25,000.00	
		150,000.00

Submitted in compliance with requirement of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

PLANT.

July 1, 1907, balance unexpended		$81,573.65
Sale of blueprints		.25
Sale of condemned property		257.41
Amount allotted from sundry civil act approved May 27, 1908		55,000.00
		136,831.31
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$42,673.15	
For maintenance of improvement	37,692.50	
		80,365.65
July 1, 1908, balance unexpended		56,465.66
July 1, 1908, outstanding liabilities		4,793.96
July 1, 1908, balance available		51,671.70
Amount (estimated) required for completion of existing project		Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$50,000.00	
For maintenance of improvement	25,000.00	
		75,000.00
Submitted in compliance with the requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

SURVEYS, FOURTH DISTRICT.

July 1, 1907, balance unexpended	$995.35
Sale of blueprints	3.25
Amount allotted from river and harbor act, March 2, 1907	5,000.00
Amount allotted from sundry civil act approved May 27, 1908	5,000.00
	10,998.60
June 30, 1908, amount expended during fiscal year for maintenance of improvement	5,299.48
July 1, 1908, balance unexpended	5,699.12
Amount (estimated) required for completion of existing project	Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, for maintenance of improvement, in addition to the balance unexpended July 1, 1908. Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.	5,000.00

LOWER TENSAS LEVEE DISTRICT.

July 1, 1907, balance unexpended		$608,848.44
Amount allotted from sundry civil act approved May 27, 1908		100,000.00
		708,848.44
June 30, 1908, amount expended during fiscal year for works of improvement		166,096.06
July 1, 1908, balance unexpended		542,752.38
July 1, 1908, outstanding liabilities		77.97
July 1, 1908, balance available		542,674.41
July 1, 1908, amount covered by uncompleted contracts		445,499.23
Amount (estimated) required for completion of existing project		Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$150,000.00	
For maintenance of improvement	10,000.00	
		160,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1889.		

ATCHAFALAYA LEVEE DISTRICT.

ly 1, 1907, balance unexpended		$61,472.48
ne 30, 1908, amount expended during fiscal year for works of improvement		24,804.61
ly 1, 1908, balance unexpended		36,667.87
ly 1, 1908, outstanding liabilities		20.41
ly 1, 1908, balance available		36,647.46
ly 1, 1908, amount covered by uncompleted contracts		29,566.86
mount (estimated) required for completion of existing project		Indeterminate.
mount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$25,000.00	
For maintenance of improvement	10,000.00	
		35,000.00

ubmitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

LAFOURCHE LEVEE DISTRICT.

ly 1, 1907, balance unexpended	$47,982.56
ne 30, 1908, amount expended during fiscal year for works of improvement	28,576.45
ly 1, 1908, balance unexpended	19,406.11
mount (estimated) required for completion of existing project	Indeterminate.

BARATARIA LEVEE DISTRICT.

ly 1, 1907, balance unexpended		$51,852.10
mount allotted from sundry civil act approved May 27, 1908		40,000.00
		91,852.10
ne 30, 1908, amount expended during fiscal year:		
For works of improvement	$27,584.44	
For maintenance of improvement	1,564.81	
		29,149.25
ly 1, 1908, balance unexpended		62,702.85
ly 1, 1908, outstanding liabilities		2,272.50
ly 1, 1908, balance available		60,430.35
ly 1, 1908, amount covered by uncompleted contracts		9,700.40
mount (estimated) required for completion of existing project		Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$30,000.00	
For maintenance of improvement	10,000.00	
		40,000.00

Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.

PONTCHARTRAIN LEVEE DISTRICT.

July 1, 1907, balance unexpended		$194,320.71
Amount allotted from sundry civil act approved May 27, 1908		75,000.00
		269,320.71
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$115,130.45	
For maintenance of improvement	581.40	
		115,711.85
July 1, 1908, balance unexpended		153,608.86
July 1, 1908, amount covered by uncompleted contracts		54,410.94
Amount (estimated) required for completion of existing project		Indeterminate.
Amount t[illegible] an be profitably expended in fiscal year ending June 30, 191[illegible] [illegible]tion to the balance unexpended July 1, 1908:		
[illegible] of improvement	$60,000.00	
[illegible]or maintenance of improvement	10,000.00	
		70,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

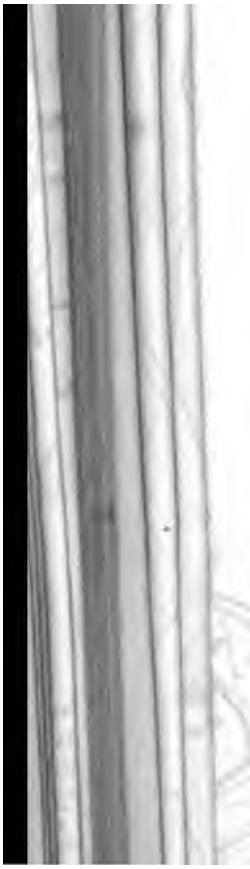
LAKE BORGNE LEVEE DISTRICT.

July 1, 1907, balance unexpended		$54,917.80
Amount allotted from sundry civil act approved May 27, 1908		40,000.00
		94,917.80
June 30, 1908, amount expended during fiscal year:		
For works of improvement	$47,413.38	
For maintenance of improvement	283.34	
		47,696.72
July 1, 1908, balance unexpended		47,221.08
July 1, 1908, outstanding liabilities		2,292.92
July 1, 1908, balance available		44,928.16
July 1, 1908, amount covered by uncompleted contracts		4,229.55
Amount (estimated) required for completion of existing project		Indeterminate.
Amount that can be profitably expended in fiscal year ending June 30, 1910, in addition to the balance unexpended July 1, 1908:		
For works of improvement	$30,000.00	
For maintenance of improvement	10,000.00	
		40,000.00
Submitted in compliance with requirements of sundry civil act of June 4, 1897, and of section 7 of the river and harbor act of 1899.		

COMMERCIAL STATISTICS

By direction of the Commission, the duty of compiling the commercial statistics of the Mississippi River is assigned to the secretary of the Commission. Reference to his report is invited for the statistics of that part of the river included in the fourth district.

2



The following papers accompany and form part of this report, the plates having been prepared in compliance with instructions of the Mississippi River Commission:

Appendix "A."—Abstract of all contracts in force during the fiscal year ending June 30, 1908.

Plate I.[a] Bondurant Chute revetment.

Plate II.[a] Kempe Bend revetment.

Plate III.[a] Giles Bend revetment.

Plate IV.[a] Revetment at Amesville, New Orleans Harbor.

Plate V.[a] Revetment in Third District Reach, New Orleans Harbor.

Plate VI. Mississippi River from Warrenton to Rifle Point (part of Lower Tensas levee district).

Plate VII. Mississippi River from Rifle Point to Red River Landing (parts of Lower Tensas and Atchafalaya levee district).

Plate VIII. Mississippi River from Red River Landing to Point Manchac (parts of Atchafalaya and Pontchartrain levee districts).

Plate IX. Mississippi River from Point Manchac to Willow Bend (parts of Atchafalaya, Lafourche, and Pontchartrain levee districts).

Plate X. Mississippi River from Willow Bend to Jesuits Bend (parts of Lafourche, Barataria, Pontchartrain, and Lake Borgne levee districts).

Plate XI. Mississippi River from Jesuits Bend to the Jump (parts of Barataria and Lake Borgne levee districts).

Plate XII.[a] Revetment at Natchez front, harbors of Natchez and Vidalia.

Respectfully submitted.

J. F. McINDOE,
Major, Corps of Engineers, U. S. Army.

Col. WILLIAM H. BIXBY,
Corps of Engineers, U. S. Army,
President Mississippi River Commission.

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[a] Not printed.

APPENDIX A.—*Abstract of contracts in force during fiscal year ending June 30, 1908, fourth district, improving Mississippi River.*

Name of contractor.	Amount and character of work.	Unit price.	Date of approval.	Date of beginning of work.	Date of expiration of contract.
Hearin & Ryan	76,000 cubic yards levee work	13.75 cents	Jan. 27, 1906	Aug. 1, 1906	Dec. 31, 1906.[a] [b]
	105,000 cubic yards levee work	11.43 cents			
	27,000 cubic yards levee work	16.50 cents			
A. Leopold	64,500 cubic yards levee work	17.75 cents	do	Jan. 29, 1906	July 16, 1906.[a] [b]
A. Joseph	28,500 cubic yards levee work	16.45 cents	Sept. 4, 1906	Aug. 28, 1906	Dec. 1, 1906.[a] [b]
R. T. Clark & Co	362,000 cubic yards levee work	36.5 cents	Sept. 27, 1906	Aug. 20, 1907	Feb. 1, 1908.[a]
H. F. Garbish	18,600 cubic yards levee work	16¾ cents	Oct. 9, 1906	May 6, 1907	Dec. 13, 1907.[a]
	104,200 cubic yards levee work	15¾ cents			
R. T. Clark & Co	19,300 cubic yards levee work	18 cents	Oct. 18, 1906	Nov. 25, 1907	Dec. 22, 1907.[a] [b]
E. P. Brady	26,600 cubic yards levee work	39 cents	do	Oct. 11, 1906	Apr. 22, 1907.[a] [b]
Hearin & Ryan	76,300 cubic yards levee work	14.99 cents	Oct. 19, 1906	Jan. 23, 1908	Jan. 1, 1908.[a] [b]
Donovan & Daley	137,000 cubic yards levee work	32.40 cents	Nov. 9, 1906	July 25, 1907	Feb. 13, 1908.[b]
A. Leopold	86,700 cubic yards levee work	22 cents	Jan. 9, 1907	July 29, 1907	Oct. 16, 1907.[a]
Robt. T. Clark	75,500 cubic yards levee work	14.7 cents	Jan. 11, 1907	do	July 25, 1907.[a] [b]
Geo. H. Conrad	60,000 cubic yards levee work	17.4 cents	Sept. 27, 1905	Oct. 24, 1905	Feb. 1, 1906.[a]
	58,700 cubic yards levee work	17.7 cents			
Helgason Bros	244,300 cubic yards levee work	33½ cents	Sept. 13, 1905	Nov. 6, 1905	Do.[a]
	120,000 cubic yards levee work	34½ cents			
H. F. Hodge	136,800 cubic yards levee work	27 cents	Sept. 19, 1905	Sept. 21, 1905	Do.[a] [b]
Israel R. Bobbitt	124,000 cubic yards levee work	33.5 cents	Oct. 31, 1905	Oct. 24, 1905	Do.[a] [b]
	119,500 cubic yards levee work	27.5 cents			
	115,600 cubic yards levee work	19 cents			
Hearin & Ryan	431,800 cubic yards levee work	16.5 cents	Oct. 25, 1905	Oct. 30, 1905	Mar. 10, 1906.[a] [b]
M. L. Linnan	20,000 cubic yards levee work	19.95 cents	July 5, 1907	June 24, 1907	Mar. 18, 1909.
	437,000 cubic yards levee work	36.98 cents			
Jas. R. Marlow	80,000 cubic yards levee work	19 cents	Aug. 15, 1907	Dec. 27, 1907	Nov. 19, 1908.
Linnan Bros. & Mullen	108,000 cubic yards levee work	21.7 cents	Aug. 7, 1907	Sept. 18, 1907	Feb. 12, 1908.[a]
	57,000 cubic yards levee work	18.5 cents			
O. A. Gibson	50,000 cubic yards levee work	19.5 cents	do	Sept. 13, 1907	Aug. 12, 1908.[b]
Albert Mackie Grocer Co	Groceries ($4,863.85)	Various	Emergency	Aug. 1, 1907	Nov. 15, 1907.[b]
Natchez Dressed Beef Co	Fresh meats ($2,651.50)	do	do	do	Do.
Guy Dickinson	15,000 tons rock	$1 per ton	Oct. 22, 1907	Oct. 11, 1907	Jan. 31, 1908.[b]
Armour Packing Co., of La	Fresh meats ($1,251.33)	Various	Emergency	Nov. 1, 1907	Mar. 1, 1908.[b]
Michael Cullen	25,000 cubic yards levee work	23.5 cents	Nov. 13, 1907	Oct. 10, 1907	Jan. 25, 1908.[b]
Woodward, Wight & Co	Groceries ($4,819)	Various	Emergency	Nov. 15, 1907	Apr. 15, 1908.[b]
O. A. Gibson	99,300 cubic yards levee work	21 cents	Jan. 15, 1908	Feb. 6, 1908	Jan. 17, 1909.
	96,600 cubic yards levee work	16.95 cents			
	171,500 cubic yards levee work	23 cents			
Hearin & Ryan	116,000 cubic yards levee work	17.94 cents	Jan. 18, 1908	Mar. 11, 1908	Mar. 1, 1909.
Robt. T. Clark	98,600 cubic yards levee work	20 cents	Jan. 23, 1908	Jan. 13, 1908	May 16, 1908.[a]
	99,600 cubic yards levee work	26.9 cents			
Gibson & Hale	90,000 cubic yards levee work	19.25 cents	Jan. 24, 1908	Jan. 30, 1908	Jan. 28, 1909.

[a] Time limit waived. [b] Contract completed during year.

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OPICAL INDEX TO ANNUAL REPORT OF THE MISSISSIPPI RIVER COMMISSION FOR 1908.

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